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GEO. D. ROBERTS Advertising Manager

Cable Address .....Autoland, Philadelphia
Telephone .....Sherwood 1424

OFFICES

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"Say, can I take this door home to the baby for a rattle?"

"No, I ain't kiddin' you, Ed. I don't know what else to do with this door. This here's the fourth time this car's been in now. I've tried everything—but that rattle just *won't* stay fixed."

More than one gray hair in the service manager's head can be chalked up against rattling doors—and the resulting jump in service costs.

• • •

The man who services cars equipped with Budd All-Steel one-piece bodies isn't troubled with complaints about rattling doors.

For these doors are made of die-formed inner and outer panels, clinched and electrically welded into a single unit—then mounted in a die-formed door opening. Result: perfect fit—and one less source of noise.

This example is typical of the care that has been taken to make the Budd one-piece body not only strong, not only safe, but quiet—permanently quiet.

The quietness of the Budd body is appreciated alike by the service man and the salesman. It reduces service costs on body noises. It helps to sell cars—and to keep them sold.

★BODIES BY BUDD★

Originators of the All-Steel Body. Supplied to Manufacturers in the United States, Great Britain, France and Germany

AUTOMOTIVE INDUSTRIES

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A New Designer Shows His Stuff

by Athel F. Denham

THE automobiles of tomorrow are going to be designed by Economic Conditions. The basic problem of the industry once was production and standardization. Later it was sales appeal. Now it is "profit or loss." We are in the midst of rapidly changing economic situations. What kind of automobile will these new conditions evolve?

It's too early to name any definite type. It is likely that several varieties will be available. But in the meantime, certain definite things will be done and the design engineer who is best able to think *and act* in terms of production necessities, sales possibilities and economic considerations will be the engineer who actually gets the chance to control the design of the vehicles produced by the company which employs him.

Let's look first at what actually is going on behind the scenes in the design of motor cars; then it may be possible more accurately to evaluate the qualities really needed in the man who, in 1932, can properly be labelled, "the ideal engineer." And—make no mistake about it—those qualities are not the same as would have

Bricks or Bouquets

The world is waiting to see the new designs being evolved by "Changing Economic Conditions." . . .

Will the show be a "bust"

?

been required in the two earlier phases of the industry.

Right now there are two distinct kinds of thinking among manufacturing executives about the immediate future of design. One group is continuing to add gadgets and doodads, relying on the sales appeal thus developed until such time as something better appears. The other group is definitely removing these gadgets more and more.

Certain it seems that there will be several really low priced automobiles sooner or later, selling between $300 and $400.

They will not be radically different, but will help in amortizing present factory equipment. Competitive necessity is forcing these cars on manufacturers with excessive overhead. Whether or not such cars will remain with us indefinitely only the future can disclose. It will be remembered that Ford at one time was in this field but was forced out of it into a *higher price class* by the falling off in public demand for mere "transportation." This condition may come about once more a few years from now.

New Designs Imminent

What is beyond the immediate present? Engineers are working on a variety of problems and designs, limited only by the amount of money the board of directors will permit them to spend. Independent springing has been mentioned so often that it seems peculiar to say it is receiving more interest today than ever before—not because of the idea itself but because of what it permits designers to do with the rest of the automobile. Even front drive, which did not live up to all the work done on it in this country two years back, is being given more study. An interesting type has been built by the head of the research division of a large corporation. It has no springs, and no mechanical connection between powerplant and driving wheels.

Another front drive is being considered by a manufacturer who may build a completely new plant for it with a completely new line of manufacturing equipment. This one would be a really low-priced automobile. Rear engine cars aren't a flash in the pan yet, by any means. Only recently one of the largest corporations took a 90-day option on the design rights to a particular car of this character.

Streamlining of bodies has hardly been started yet. Wind tunnel tests are becoming an important function with body manufacturers. These call for intensive work on die costs, about which many manufacturers are emphatic, "something must be done."

Transmissions Being Improved

Automatic transmissions, while postponed from introduction at the 1932 automobile shows, are undergoing intensive development. Strenuous efforts are being made to create desirable engineering design which will synchronize with possible production methods. Work is going slow only for lack of available funds due to rulings on capital expenditures.

And so it goes. New ideas in frame structure and assembly methods, such as welding; new ideas in tires which call for important changes in wheels, axles, steering gears, suspension systems, and so forth; a better coordination of chassis and body design; the use of new alloys to increase the length of car operation between "service calls" and the production problems these alloys bring, as in the case of centrifugally cast brake drums and special steel valve inserts.

Do not all these and other possibilities looming ahead indicate that the requirements for effective operation by engineers to be entering a new phase? It would seem so.

When the history of the industry is brought up-to-date a few years from now, 1932 may be pointed out as having marked an important turning point in the evolution of the engineer—providing the engineer is capable of adapting himself to the new demands which are being placed upon him.

"New Engineer" Evolving

For the third time within five years the qualifications needed by "the ideal automotive engineer" have altered radically. Economic conditions have brought about each change.

First it was quantity production. The order of the day was more and more cars. Standardization was the watchword and the bible of the engineer.

But in 1929 the picture suddenly began to change. As Mr. Kettering has so aptly put it, standardization suddenly became a "quagmire of cut-throat competition and no profit," when the curve of automotive sales refused to continue its climb and took a sudden nosedive.

The industry was caught unprepared. Vast plants with tremendous overhead in unamortized equipment, good only for building what then was being built aggravated the problem. Radical changes could not be made either in design, in sales methods, or in production methods.

The second modern phase of automotive engineering had been reached. It has as a basis the desire to halt the decline in replacement sales. We couldn't radically change the major components of the automobile, so we added to it. Gadgets, new little tricks with sales appeal. They helped—these sloping windshields, freewheeling units, automatic clutches, automatic starters, and chokes, synchronizing devices, intake silencers, and the rest. To further prove that standardization was no longer desirable, one or two manufacturers built "different" cars, and reaped the benefit therefrom.

Designer Keyed to Production

That was the second phase. If the decline in purchasing power could have been halted the third phase might have been delayed somewhat, possibly it would never have been reached so clearly and unmistakably. Sales, however, after apparently stabilizing themselves for the time being at a lower level during the early part of 1931, took another nosedive. There arose a conviction in the industry that new ideas alone could not bring back automobile sales to a profitable level. The basic problem was no longer production or "sales," but rather "profit-or-loss."

In the first phase, the production man was the engineer. In the second the salesman was the engineer. As we enter this third phase, the engineer becomes the production man.

What is profitable in the way of capital expenditures? What should be the production cost for a given unit? How will we be able to change rapidly a design which doesn't click? How can we economically develop and produce cars designed for the new markets into which automotive concerns are being pushed by economic conditions? How are these problems interrelated and what is their relative importance? All these are problems for the final solution of which the industry today has to look to the engineer.

JUST AMONG OURSELVES

Shall We Dip Or Dunk "Doughnuts"?

THE paragraphs immediately following are written exclusively for reading by passenger car engineers. It is hoped that they can be kept a secret so far as the sales and general executive departments are concerned. They relate to the uncomfortable situation in which many car engineers find themselves as regards sales department pressure for adoption of "doughnut" tires on 1933 models. They were conceived more or less facetiously, but may have their serious side. Anyhow, here goes:

Don't be too darned technical when arguing with the sales department about this development. They know already you're against it and probably have heard all your reasons. Your reasons haven't won the argument for you yet. Start talking and thinking instead in the same terms the sales department talks and thinks in.

Sales department is interested in the appearance value of the new tires—in the beauty of appearance which they give and in the appearance of comfort which they give. Sales department is interested in the advertising and promotion value to be derived from being able to talk about a model equipped with these new units. They want to cash in on the ballyhoo the tire companies have been spending hundreds of thousands of dollars creating.

Sales Executives Want Ad Slogans

Sales department isn't particularly interested in detailed specifications, is it? But it is vitally interested in being able to advertise "We've got Superballoon tires!" or "We've got Doughnut tires!"

All right, give them that chance. What is a "superballoon" anyhow? Has anybody yet been able to define the term specifically and scientifically? No, and probably nobody ever will. Nobody has ever defined "balloon" yet. About as close as anybody can come is to say that a superballoon is a tire of larger section and lower inflation than those used on the given model previously.

Sell 'Em Pictures

Then why not decrease the wheel size an inch or so more; increase the tire one or two sizes; get some good, snappy photographs or drawings made of the new car; and then go into the sales department and announce that you've got "superballoons" for the new model. Lay down the drawings or photographs before their eyes, show some enthusiasm for the new design yourself and indicate that you did it because you thought the sales department had the swell idea to begin with.

They'll take your word for the "superballoon" definition; the definition itself won't be any more inaccurate than a lot of others that have been used in promotion and advertising copy before; your company will have been saved thousands of dollars in immediate experimental work; you will be able to keep the various elements of your 1933 design in balance; and the dear old public will enjoy its 1933 models because it will be a step in evolution instead of a bombshell of revolution.

And the advertising department will be able to advertise in just the same words as if you went the limit in large sections and low pressure immediately.

Kind of a silly idea, isn't it?

Huck Finn Out-traded

STORIES of business reverting to the old practice of bartering have become common lately, but most of those which we have heard have referred to industries other than our own. Some automobile dealers seem to be coming to it, too. What we consider to be authentic information came to us the other day about a dealer for an important middle priced line in Great Neck, N. Y., who recently took in lieu of a down payment on a new car a set of dining room furniture, an old ice box and a piano. The dining room set, it appears, has already been resold.

Tax Puddle Settling Down

NOW that the automotive excise tax has gone into effect, more work has been provided for some figure-experts in every automotive company. The N.A.C.C. through the cooperation of individuals appointed by member companies has done its usual thorough advance job of ironing out the interpretations of the new law, relaying to its membership details about how the tax will be administered and just what must be done in applying it. Other associations have aided materially in this work.

But still confusion exists on a number of specific points so far as a number of manufacturing executives are concerned, particularly in the complicated parts, accessory and shop equipment field. Clarification of the application of the new law, however, grows each day.—N.G.S.

Shot Welding Opens New U

by

Joseph Geschelin

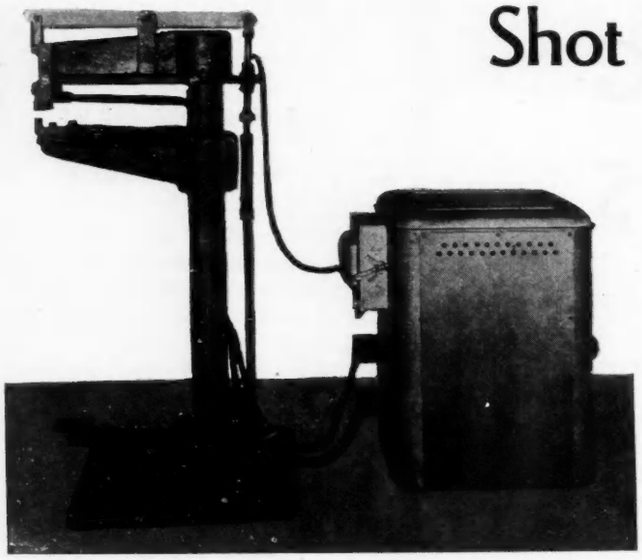


Fig. 1 — Shot-welding machine developed by E. G. Budd. The cabinet at the right contains the control mechanism and the automatic recorder. By means of power cables the cabinet is connected to hand tongs or a fixed welding head

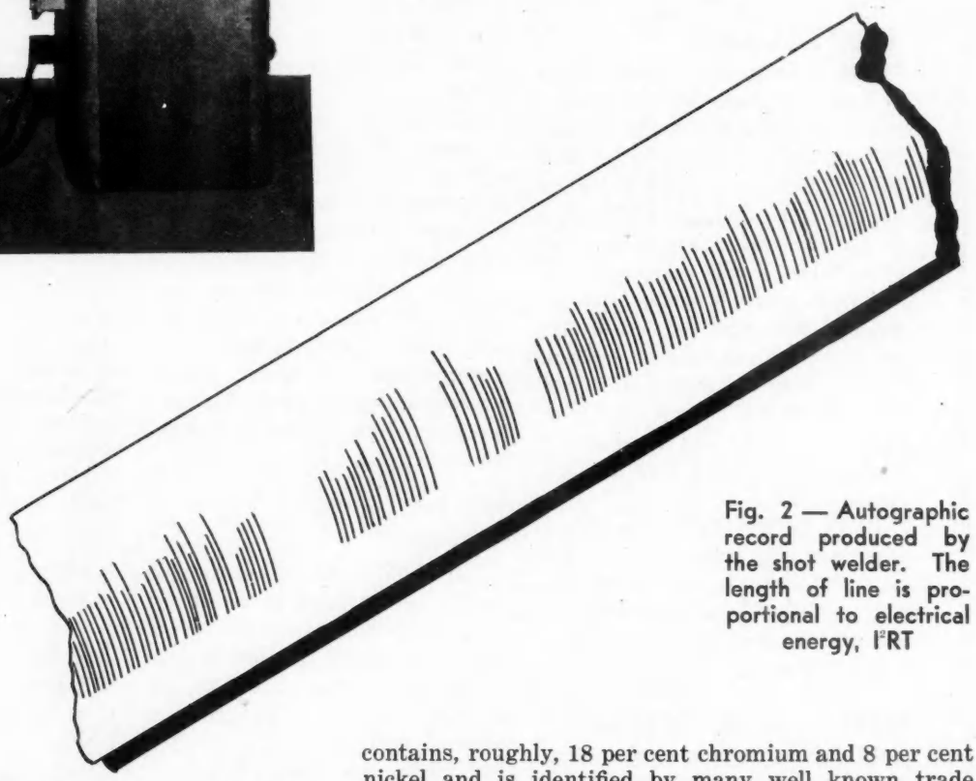


Fig. 2 — Autographic record produced by the shot welder. The length of line is proportional to electrical energy, I^2RT

SOME time ago we mentioned "shot" welding rather informally in these columns. And ever so many people wrote in to ask didn't we mean "spot" welding.

Shot welding it is. In its final development by the E. G. Budd Mfg. Co., shot welding produces pedigreed resistance-welds of uniform size and uniform quality due to a patented, timed control of welding current.

Shot welding places stainless steel (18-8), a new structural material, for more uses at the disposal of the engineer.

When formed in slender well-proportioned sections, it makes an admirable structural material for aircraft, railcar and other automotive applications where light weight, high tensile strength and great resistance to fatigue are requisite.

During the past few years, people in many corners of the industry have been working on the problem of using stainless steel. They were baffled at first by the peculiar behavior of the material; its sensitivity to temperature changes and the steep rise in hardness and tensile strength incident to cold work. But, out of this has come a successful method which leaves the metallurgical character of the metal unaltered.

First, let us examine the properties of stainless steel sheet that make it so valuable to the engineer. 18-8 contains, roughly, 18 per cent chromium and 8 per cent nickel and is identified by many well known trade names. Its chief claim to structural use lies in the capacity for retaining toughness and ductility after cold-working to high tensile values. In its most ductile and soft state 18-8 has a tensile strength from 85,000 to 90,000 lb. per sq. in. and an elongation of about 65 per cent in two inches, but the yield point is only 38,000 lb. per sq. in. However, when cold drawn or rolled it will attain a tensile strength of 200,000 lb. per sq. in. and an elongation of 6 to 8 per cent. In this state, the yield point approaches the ultimate strength.

At this stage the metal is perfectly controllable and workable from the production point of view. It will not tear along the grain as will spring steel and it displays a toughness seldom associated with material of this high tensile strength. Resistance to corrosion, though still very high, has been lessened while resistance to fatigue has been materially increased.

Now stainless steel has a very peculiar property. Quoting from a recent paper (1) by Dr. John A. Mathews, Director of Research, Crucible Steel Co. of America, "In contrast with ordinary steels the austenitic chromium-nickel alloys are essentially non-magnetic

(1) "Cause and Cure of Intergranular Corrosion in Austenitic Steels," by John A. Mathews, Jour. of the American Welding Society, April, 1932. "Ductility and Corrosion in Welding Up at A. W. S. Meeting," by Joseph Geschelin, *Automotive Industries*, May 7, 1932.

Uses For Stainless Steel

Intergranular corrosion, rendering 18-8 steels difficult to control under heating processes, avoided by reducing to minimum time interval of weld in process developed by E. G. Budd Mfg. Co.

although some of them may be made very slightly magnetic by certain heat treatments. If we want to anneal them we take them up to some such temperature as 2000 deg. F. and quench them in water. The annealing process as employed for ferritic steels will harden some of the austenitic steels to a slight extent. However, they may not be hardened by low finishing temperatures on hammers or rolls and may be very greatly hardened by cold work in rolling and drawing. Some of them become magnetic as a result of cold work."

This brings us to the phenomena that troubled so many early investigators. When the austenitic chromium nickel steels are reheated for any purpose between temperatures of 1000 to 1500 deg. F. a change takes place in the structure which renders them subject to attack by many electrolytes, this attack taking place between the grains so that after long duration the material becomes very weak and brittle and in some cases may be even crumbled with the fingers. This is known as intergranular corrosion.

According to Dr. Mathews, the usual explanation for intergranular corrosion is, "that at the embrittling temperatures between 1000 and 1500 deg. F. carbides are thrown out of solid solution in the austenite and precipitate at the grain boundaries. Each atom of carbon combines with about 15 times its own weight of chromium to form the chromium carbide. On precipitation it is believed by many that there is an impoverishment in the chromium content immediately surrounding each carbide particle. This does not mean chromium content of the entire grain but a severe local impoverishment around the carbide particles themselves. It is further believed that because of the difference in potential in adjacent areas, due to varying of the chromium content, corrosion becomes possible."

The connection between this and the welding process is the fact that in making either a gas or electric weld, the material adjacent to the deposited weld metal is subjected to a temperature gradient varying from that of the molten metal to room temperature. Obviously this will include the "trouble" range between 1000 and 1500 deg. F. The chief principle involved in shot welding is to control the time during which the heating occurs. If the time interval is sufficiently small it is thought that the carbide particles will not have time to form. This hypothesis seems to be borne out by the facts.

In production, shot welding is accomplished by means of the Budd shot-welding machine shown in Fig. 1. Its outstanding features are absolute uniformity of current supply, use of high current in a very brief, controllable time element and an automatic recorder which provides both a visible and audible record. To meet the flexibility needed in the fabrication of aircraft or railcar structures, the machine is made portable and may be brought directly to the work. For otherwise inaccessible places, special hand tongs are used for making the weld; on straight run production jobs the machine can be hooked up quickly to a fixed welding head as shown in Fig. 1.

The secret of the process lies in the fact that the resistance of the stainless steel sheet is 8 to 14 times that of ordinary carbon steel. Now since electrical energy equals, I^2RT, (where I, is the current in amperes, R, resistance in Ohms, and T, the time in seconds) the time interval, T, can be made as minute as is desired by increasing current density. Fortunately the time element can be cut at least by one-tenth simply by virtue of higher resistance. On the other hand, the current need not become abnormally high because the energy varies as the square of current density.

The automatic recorder which is one of the principal features of the method is a device which measures the electrical energy expended at each weld. The character of the record is shown in Fig. 2, the length of the line being proportional to electrical energy. It is noticeable that there is considerable variation at the beginning of a run as indicated by the length of the line at the left, then adjustments are carefully made until the desired degree of uniformity, as shown at the extreme right, has been achieved.

Thus, the tape becomes an autographic record of every weld, making it possible to check back on the operator and spot the exact location of a defective weld. As a further precaution the indicator is provided with

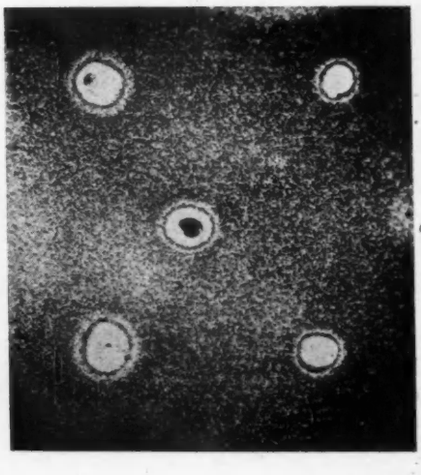


Fig. 3—Five spot welds showing formation of corona due to variations in welding time and current density. Magnification 2½ times. Etched with hydrofluoric acid

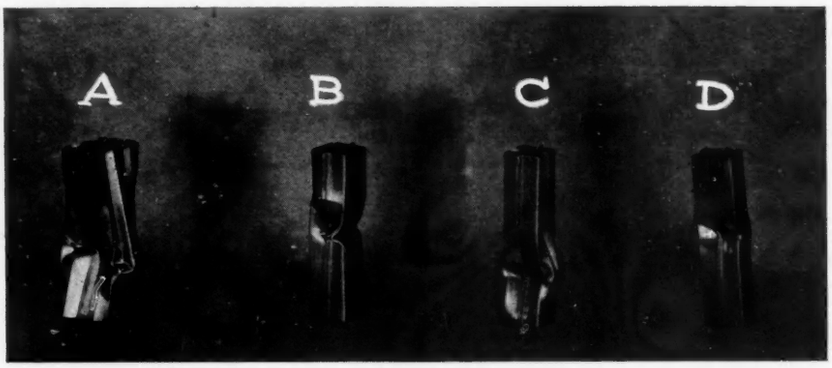


Fig. 4—Samples of shot-welded columns. Left to right: (A) Weight, 0.332 lb.; compression load at failure, 10,000 lb. (B) Weight, 0.40 lb.; compression load at failure, 16,000 lb. (C) Weight, 0.43 lb.; compression load at failure, 20,500 lb. (D) Weight, 0.304 lb.; compression load at failure, 13,500 lb. Note weight of sections and compression load at failure

a bell which rings whenever the weld is defective, thus warning not only the operator but the man in charge of the department.

It is believed by the Budd organization that the diameter of the fused slug should have some reasonable relation to the thickness of the sheet. Accordingly shot welding encourages the use of a narrow flange, much narrower than would obtain in a riveted connection. They recommend a spot not greater in diameter than three times the double thickness of the material, the flange in turn being at least three spot diameters in width. Under the circumstances it is easy to see why so much emphasis has been placed on a corona-free weld. Without going too far into technical details, suffice it to say that a welded spot is usually surrounded by an annular ring of precipitated carbide which, although invisible to the naked eye is readily detected under the microscope. Fig. 3 shows five spot welds each having a different time interval and different current density. When sectionalized and etched with hydrofluoric acid, the corona is plainly in evidence.

With shot welding, it has been proved that the corona does not form. This is very important because a large corona effect would surely reach the edge of the narrow flange where fatigue failure usually starts. Since the current and dwell are established by the machine, the operator has no choice in these matters and cannot affect the quality of the weld. An inspector usually makes the setting for test welds and adjusts the recorder to the new value.

While normal practice is to use two electrodes, it is practical wherever necessary to resort to indirect welding. So far, Elkonite has proved to be the most satisfactory tip material. A small piece is brazed to the point of each electrode, the smaller the better, since Elkonite is a copper tungsten alloy and reduces electrical conductivity. Where rapid welding is done on automatic machines, the electrode should be water cooled.

Not the least of the problems in connection with the fabrication of stainless steel sheets is that of forming. According to Col. Ragsdale, high tensile stock is not readily formed in hand or power brakes because it slides readily in the grip. Short lengths can be handled in this fashion provided spring-back is taken care of. Fundamentally stainless construction appears to depend upon rolled sections, the most successful production method being that of pulling the strip through a series of forming rolls. Four pairs are sufficient to form any conventional section.

As a result of a considerable period of research, the Budd organization has accumulated a wealth of experience in the design of light-weight, high-strength, built-up sections. Four of the more simple forms are shown in Fig. 4. Considering the unit weight of the sections, their load-carrying capacity is quite remarkable. By a judicious disposition of metal in more complicated built-up sections they have built some columns which carry loads up to 100,000 lb.

Some idea of the refinement in design made possible through the improved technique in welding and forming may be gained from Fig. 5 which shows two designs of aircraft wing ribs. The lower rib is an early design employing U-sections, shot welded at their junctions through gusset plates. The upper view shows a later design built up without the use of gussets, thus cutting cost of fabrication without any sacrifice in strength or rigidity.

In various quarters people are endeavoring to solve the problem of the utilization of stainless steel in other ways. Dr. Mathews cites research work in three different directions on the parts of steel mills. Their objective is to produce an alloy free of susceptibility to intergranular corrosion. He also suggests such expedients as heat treatment of parts after fabrication. However, the latter is not so economical nor is it so practical when applied to large work.

After an intensive study of the several alternate methods of fabrication, Col. Ragsdale and his associates at E. G. Budd feel that shot welding offers the most economical and practical solution in the present state of the art.

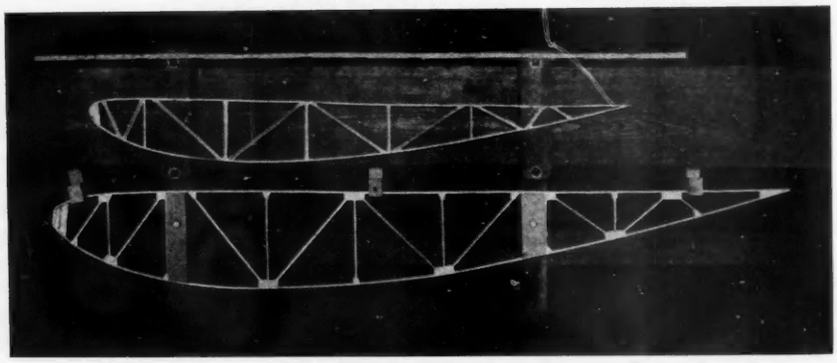


Fig. 5—Steps in the simplification of aircraft rib design. The upper rib is fabricated without resort to gussets

Bendix Combines Two Brake Designs

COMBINING the features of the Bendix two-shoe, single anchor-pin, duo servo brake with the Lockheed hydraulic cylinder controls, a new braking system has been developed by the Bendix Brake Co. For the present it finds its widest application on Auburn 1932 cars.

The system consists of a master cylinder in which hydraulic pressure is originated; a cylinder in each wheel which operates the brake shoes; a supply tank by which the fluid is maintained at constant volume, and the "line," consisting of copper tubing and flexible hose, connecting the master and wheel cylinders.

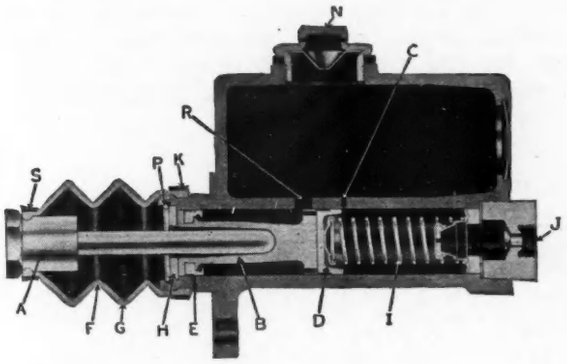
When the brake pedal is depressed it moves a piston in the master cylinder, thus displacing the brake fluid from the master cylinder and forcing it through the line into the cylinders at each wheel. The fluid enters each of the wheel cylinders between their opposed pistons, causes them to move outward against the brake shoes and brings the shoes in contact with the drums. As pressure on the pedal is increased, greater hydraulic pressure is built up within the wheel cylinders and consequently greater force is exerted against the shoes.

When pressure on the pedal is released, springs on the brake shoes return wheel cylinder pistons to their normal or "off" positions, thus forcing the brake fluid back through the line into the master cylinder.

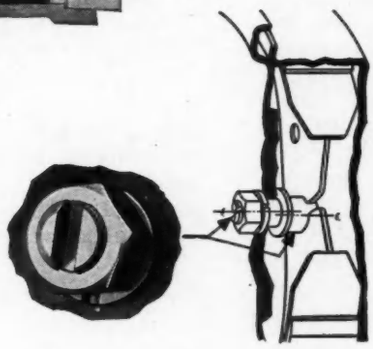
A combination type master cylinder is used in the new brake system. It consists of a supply tank cast integral above the master cylinder barrel, in which the standard hydraulic compensating features are incorporated. This unit performs two functions. Primarily, it maintains a constant volume of fluid in the system at all times regardless of expansion or contraction from heat or cold. The secondary function is replacement of fluid in the system to compensate for any loss due to gravity seepage.

The return to "off" position of piston *B* and cup *D* is much faster in displaced volume than return of fluid from the line through fitting *J*. A momentary vacuum is created in the cylinder barrel and additional fluid is drawn into the system through holes in piston *B* past the lip of cup *D*. The fluid returns more slowly from the wheel cylinders and line to the master cylinder barrel, and any excess is by-passed through port *C* into the supply tank. Thus the master cylinder barrel is constantly filled with fluid and ready for brake applications, no matter in how rapid sequence they come. Secondary cup *E* prevents fluid leaking out of master cylinder into boot *G*.

For proper pedal adjustment, rod *A* is adjusted for clearance where it seats in piston *B*. If this adjustment is not properly made, port-hole *C* may be blocked by cup *D* and the compensating action of the master cylinder destroyed. Cup *D* must be clear of port *C* when piston *B* is at its "off" or returned position. This can be determined by making sure there is about ½ inch free movement of the brake pedal before the pressure stroke starts.

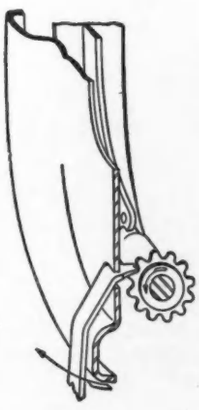


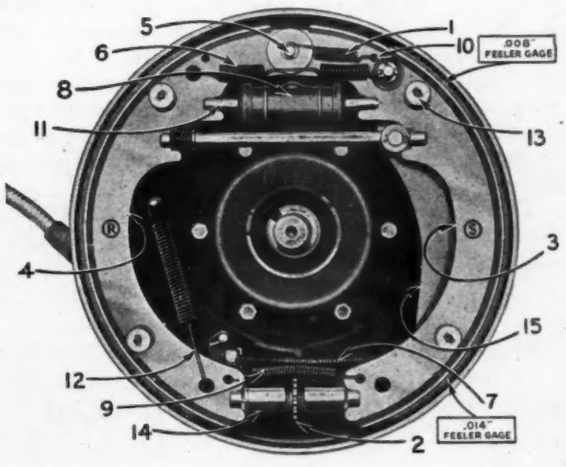
Above — Sectional view showing master cylinder and supply tank for brake fluid



Right—Method of operating adjusting screw

Below—Eccentric type anchor pin





Wheel side view of left rear brake with drum removed: 1, secondary shoe return spring; 2, adjusting screw; 3, secondary shoe; 4, primary shoe; 5, anchor pin; 6, primary and secondary shoe return spring; 7, cable return spring; 8, wheel cylinder; 9, adjusting screw locking spring; 10, secondary shoe spring anchor hole; 11, piston pin; 12, primary shoe return spring; 13, shoe hold-down spring; 14, pivot nut; 15, parking brake operating lever

Load on Front Wheels of Tractor Rises Irregularly With More Brakes in Train

If brakes were applied to the trailer wheels only, in a tractor and semi-trailer arrangement, there would be a pull on the coupling. With brakes on all six wheels the trailer continues to push on the coupling when the brakes are applied

FOR some years now, with the general improvement of braking equipment, it has been a growing practice to equip semi-trailers with brakes which are operated from the driver's seat, and in some states such trailer brakes are compulsory. With brakes on the trailer wheels, in addition to all four of the tractor wheels, the entire weight of the train is available for braking purposes, and the maximum rate of retardation is greater than with brakes on tractor wheels only.

The rate of retardation being greater, more weight is transferred from the trailer wheels to the bolster, and from the rear wheels of the tractor to its front wheels. On the other hand, since there is now a retarding action on the trailer wheels as well as on the tractor wheels, there is less push of the trailer on the coupling when the brakes are applied.

If brakes were applied to the trailer wheels only, there would, of course, be a pull on the coupling, but with brakes on all six wheels the trailer continues to push on the coupling when the brakes are applied.

The reason for this is that the retarding forces required by the tractor and trailer are proportional to their respective weights, while the retarding forces produced by them are proportional to the loads on their respective wheels, and since some of the trailer weight is supported on the tractor wheels, the tractor produces more than its share of the retarding force, hence the trailer still pushes forward on the coupling when the brakes are applied.

Referring now to Fig. 1, when the brakes on all six wheels are locked, the total retarding force evidently is $(W + W_1)\ \mu$, and since the proportion of this retarding force on the tractor is $W/W + W_1)$, it follows that the retarding force on the tractor alone is $W\ \mu$. Similarly, we find that the retarding force on the semi-trailer is $W_1\ \mu$. The reactions of the ground on the three pairs of wheels, respectively we will designate by Rr_1 Rr_2 and Rr_4.

Taking moments of the forces acting on the trailer around the transverse horizontal axis through the coupling center we have

$$Rr_4 L_1 + W_1\ \mu\ (H_1 - h) = W_1\ l_3,$$

from which it follows that

$$Rr_4 = W_1 \frac{l_3}{L_1} - W_1\ \mu \frac{H_1 - h}{L_1} = \frac{W_1}{L_1}\left[l_3 - \mu\ (H_1 - h)\right]$$

Considering next the forces acting on the tractor, we have the reaction Rr_1 vertically upward on the front wheels at the points of contact with the ground; the weight W concentrated at the center of gravity, and the inertia force $W\ \mu$ acting at the center of gravity and directed forwardly. In addition there is a forward push of the trailer on the coupling connecting it to the tractor, which is equal to the product of the load resting on the coupling when the train is being braked, into the friction coefficient μ. The vertical load on the coupling or fifth wheel when braking is

$$W_1 - Rr_4$$

$$= W_1 - W_1 \frac{l_3}{L_1} + W_1\ \mu \frac{H_1 - h}{L_1}$$

and the inertia force due to this load on the bolster is

$$W_1 \mu - W_1 \frac{l_3}{L_1}\ \mu + W_1\ \mu^2\ \frac{(H_1 - h)}{L_1}$$

This latter force, which acts horizontally forward on the coupling between the tractor and trailer, has a moment arm h around the line through the center points of ground contact of the tractor rear wheels.

Taking moments around this axis we get,

$$Rr_1 L = W l_2 + W\ \mu\ H + W_1\ \mu\ h - W_1 \frac{l_3}{L_1}\ \mu h + W_1\ \mu^2\ h\ \frac{(H_1 - h)}{L_1}$$

$$\text{and } Rr_1 = \frac{W}{L}(l_2 + \mu\ H) + \frac{W_1\ \mu\ h}{L}\left[1 - \frac{l_3}{L_1} + \mu \frac{(H_1 - h)}{L_1}\right]$$

To obtain the distribution of weight among the three pairs of wheels, we solve the equations for the load on the front wheels (Rr_1) of the tractor and the load on the trailer wheels (Rr_4), and by subtracting the values thus obtained from the combined weight of the tractor and trailer we obtain the weight on the rear wheels of the tractor.

by P. M. Heldt

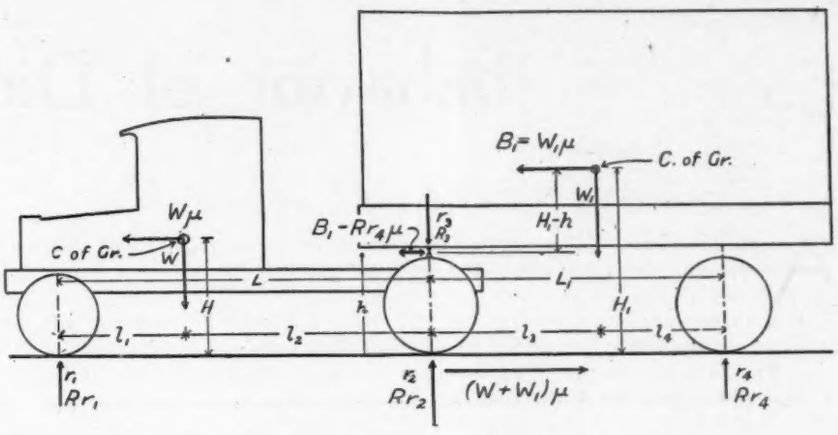


Fig. 1—Diagram of load distribution when brakes are applied to all three pairs of wheels

We will now apply these equations to a practical case, using the same data as in the preceding article on weight transfer due to the application of brakes to the wheels of a tractor hauling a semi-trailer, viz.: $W = 6000$ lb.; $W_1 = 24{,}000$ lb.; $L = 140$ in.; $L_1 = 180$ in.; $l_1 = 65$ in.; $l_2 = 75$ in.; $l_3 = 100$ in.; $l_4 = 80$ in.; $H = 28$ in.; $H_1 = 65$ in.; $h = 30$ in.; $\mu = 0.6$. This gives the following:

In the case of our example we get the following:

$$Rr_1 = \frac{6000}{140}(75 + 0.6 \times 28) + \frac{24000 \times (0.6 \times 35)}{140}\left[1 - \frac{100}{180} + 0.6\,\frac{65 - 35}{180}\right]$$

$$Rr_1 = 3940 + 3600\,(0.545) = 5900 \text{ lb.}$$

The load on the trailer axle is

$$Rr_4 = \frac{24000}{180}\left[100 - 0.6\,(65 - 35)\right] = 10930 \text{ lb.}$$

The load on the tractor rear wheels is

$$30000 - 5900 - 10930 = 13170 \text{ lb.}$$

In Table 1 herewith the distribution of load on the three pairs of wheels when the train is stationary and when brakes are applied to the tractor rear wheels only, to both pairs of tractor wheels, and to all three pairs of wheels, are tabulated.

Weight Distribution on Tractor-Train Wheels

	Static	Brakes on Tractor Rear Wheels	Brakes on Four Tractor Wheels	Brakes on All Six Wheels of Train
Front tractor wheels	3,210	5,025	5,815	5,900
Rear tractor wheels	13,440	12,620	12,285	13,170
Trailer wheels	13,350	12,355	11,900	10,930
Total	30,000	30,000	30,000	30,000

It will be seen from this table that the load on the tractor front wheels increases continuously with the number of brakes, although very irregularly. The tractor rear wheels carry substantially the same load when brakes are applied to all six wheels as when the train is stationary, which is evidently due to the fact that application of the brakes transfers about as much weight from the trailer wheels to the tractor rear wheels as it transfers from the tractor rear wheels to the tractor front wheels. The load on the trailer wheels decreases continuously with the number of brakes applied, but the addition of tractor front wheel brakes removes only about half as much weight from the trailer wheels as does either the application of tractor rear-wheel brakes alone or the addition of trailer brakes.

Experiments with High Compression

EXPERIMENTS with high compression in engines are being carried out at the Detroit laboratory of the Ethyl Gasoline Corporation with a single-cylinder engine of 3¼ in. bore by 5 in. stroke. In one series of tests the compression ratio was so adjusted (variable-compression engine) that with the regular cooling system it was necessary to partly close the throttle to prevent detonation. A valve so arranged that cooling water could be circulated through it was found to permit of an increase in power output of 8 per cent, with a mixture ratio of 15 to 1.

The use of soapsuds as a crankcase lubricant, in connection with spraying the lubricant in copious quantities on the under side of the piston, made possible an increase of 25 per cent in the power output of the engine on the same fuel without detonation. A combination of these two types of coolin, increased by one-third the power output of this same engine. It was found that the increases in power output are less pronounced when richer mixtures are used.

Behavior of Diesel Fuel Sprays

At the National Oil and Gas Power Meeting of the American Society of Mechanical Engineers, held at Pennsylvania State College, June 8 to 11, there were presented the results of further investigations into the behavior of fuel sprays and their effect upon fuel-injection engine performance, as conducted at the Pennsylvania State College research laboratories and under the supervision of the National Advisory Committee for Aeronautics. Particular interest developed in the discussion of these problems as related to engines of the automotive type (of from 4 to 6 in. bore).

A paper on "Fuel-Spray Formation," by Dana W. Lee of the N.A.C.A., and one on "Spray Characteristics of a Jerk-Pump Fuel-Injection System," by O. F. Zahn of Pennsylvania State College, the latter relating to experiments carried out with the Bosch injection system, contained material that is not only of theoretical value but directly applicable in the improvement of injection-engine performance.

While some of those who discussed these papers felt that the work still has too much of a theoretical character, and suggested that further investigations deal with the problems facing the designing engineer, others expressed the view that a common basis of understanding would be reached soon. When the discussions are compared with those of previous meetings at State College, it is apparent that many of the former controversial points have been eliminated and differences of opinion adjusted through a better understanding of just what takes place within the combustion chamber of an injection engine.

Combustion phenomena were dealt with in two papers, to one of which there was appended a written discussion by Prof. Dr. Kurt Neumann of Hannover, Germany. One of these, "Combustion Knock in Diesel Engines," by Dr. P. H. Schweitzer, was published in slightly abbreviated form in *Automotive Industries* of June 11. The other, "Surface-Volume Ratio as a Critical Factor in Automotive Diesel Combustion Chambers," by Julius Kuttner, presented details concerning combustion chamber form and size and its effect on flexibility and other performance factors affected by the rate and completeness of combustion of the fuel in the cylinder.

The Bosch pump experimented with by Mr. Zahn was a constant-stroke, single-cylinder unit of the well-known type. Oil enters the plunger space through a cylinder port and is discharged through a spring-loaded delivery valve. Metering is effected by a channel cut in the plunger overrunning the inlet port. Cut-off can be adjusted to take place earlier or later by rotating the plunger with the metering rack, according to the load. The maximum pump discharge is given as 350 cu. mm. (0.214 cu. in.), (0.30 gram for an oil of 0.864 sp. gr.). The maximum discharge corresponds to about 100 per cent overload of a suitable engine, and never would be used. A discharge of 0.15 grams with 40 per cent excess air is equivalent to a cylinder size of about 5½ in. by 7 in. The plunger diameter is 0.354 in., and the plunger stroke, 0.394 in. The oil line used was a steel tube 36 in. long, of an inside diameter of 0.10 in. and outside diameter of 0.25 in.

The injector was of the spring-loaded differential valve-stem type, with a small pin which projects through the orifice. The valve diameter is 5 mm. (0.1968 in.), the orifice diameter, 1.094 mm. (0.0431 in.), and the opening pressure is adjustable between 0 and 5000 lb. p. sq. in.

The oil used was Diesel fuel oil of 0.864 specific gravity and 48 sec. Saybolt viscosity at 79 deg. Fahr.

It was found that while the pump is running over the speed range covered by the tests, viz., 131 to 506 r.p.m., with a nozzle opening pressure of 900 lb. p. sq. in., the residual line pressure never drops below 500 lb. p. sq. in. In normal operation the equipment showed no dripping between sprays.

Owing to the work done on the fuel, the issuing spray was hotter than the oil in the pump supply reservoir. The temperature rise was found to be independent of the amount of discharge, but it varied with the speed from 6.5 deg. Fahr. at 131 r.p.m. to 10 deg. at 506 r.p.m. At higher speeds more energy is imparted in a given time, hence the oil temperatures are higher. At 506 r.p.m. this rise in temperature changes the viscosity of the oil from 49 to 46 sec. Saybolt. The discharge was only very slightly affected by the back pressure in the receiving reservoir, varying from an average of 0.2873 gram for the speed range 131 to 506 r.p.m. at atmospheric pressure to 0.2813 gram at 200 lb. p. sq. in. back pressure.

In making tests of the variation of fuel discharge

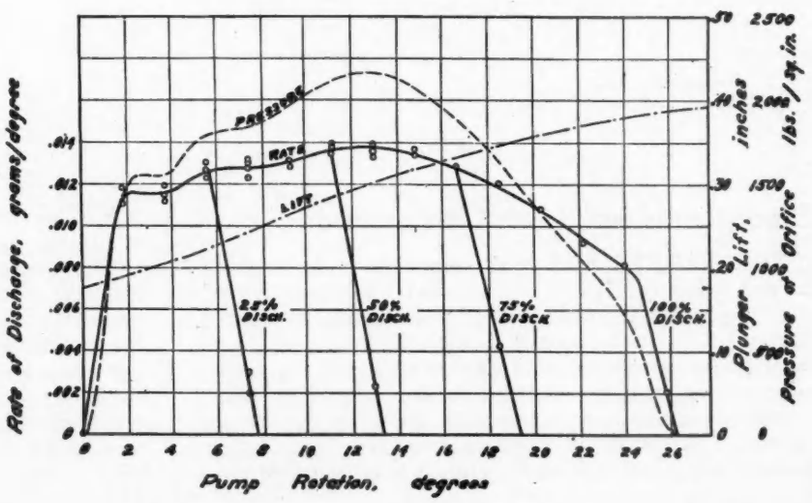


Fig. 1—Curves of plunger lift, rate of discharge and line pressure

Reported Upon at Penn State

by Edmund B. Neil

National Oil & Gas Power sessions disclose further research on fuel injection problems for automotive powerplants

with changes in the position of the pump-throttle rack, it was found that at high nozzle-opening pressure an injection does not take place at every revolution of the pump, if the pump delivery is too small to compensate for the compressibility of the oil. At higher valve-opening pressures the atomization of the fuel is much finer. Metering was found to be most accurate for an opening pressure of 2500 lb. p. sq. in. but seemed to be independent of the speed or quantity of discharge.

The rate of discharge of the injector was determined by means of the spray stroboscope. Tests were made at atmospheric pressure, at a pump speed of 131 r.p.m., and at 25, 50, 75 and 100 per cent discharge (100 per cent = 0.28 gram). The results are plotted in Figs. 1 and 2 and show sharp beginning and cutoff of the spray. Cutoff is sharp, particularly for discharges lower than 75 per cent. No tendency to dribble is shown by the curves. Injection always begins at the same angle of pump cam, irrespective of weight or speed. The areas under the rate curves represent the weights of discharge, and upon measurement gave 0.287 gr., 0.216 gr., 0.139 gr. and 0.068 gr. at 100, 75, 50 and 25 per cent discharges, respectively, which agree within the limits of accuracy with the metering tests. The mean rate of discharge is highest at 75 per cent discharge and lowest at 25 per cent discharge, but is fairly uniform over the whole injection period.

The period of injection is nearly directly proportional to the weight of discharge, up to 75 per cent discharge.

Assuming a coefficient of discharge of 0.8 and a constant orifice area, the oil pressures back of the orifice were calculated from the rate curve and plotted in Fig. 1. The nozzle-opening pressure was 900 lb. p. sq. in., but the maximum calculated pressure is over 2100 lb. p. sq. in.

In his discussion of fuel-spray formation Mr. Lee brought out the importance of knowing the effect of air density, the injection period and injection pressure on the distribution of fuel within the spray itself. Photomicrographs of fuel sprays were made at a magnifying power of 10. Many of these photomicrographs are strikingly similar to the photographs made by Scheubel of fuel being atomized in a model carburetor, and indicate that the atomization processes in carburetors and in Diesel sprays are very similar, if not identical.

The atomization tests reported in the paper showed that a change in the air density had no decided effect on the atomization, whereas the experiments of Sass showed that an increase in the air density resulted in a finer atomization. Certain of the photomicrographs offer a possible explanation of these different results. They indicate that the atomizing process begins as soon as the fuel leaves the nozzle and continues until the friction between the fuel and the air can no longer produce ligaments. Although at equal distances from the nozzle the atomization seems to vary as the density of the air, the total penetration of the sprays will also be dependent on the air density, so that the final atomization may be the same for all densities. Sass caught the fuel particles after they had traveled only about 8 in., and it may be that the atomizing process had not been completed at that distance, especially at the lower air densities. In the N.A.C.A. experiments the fuel particles had lost all of their velocity relative to the air before they were caught on the lampblack.

In discussion following Lee's paper, H. K. Cummings of the Bureau of Standards reiterated the belief that the mechanism of atomization was now beginning to be understood. The method of utilizing Plasticene for penetration experiments was commended by Schweitzer as being ingenious and useful. He also brought out that while the Lee tests gave comparative results, those conducted at Pennsylvania State College were aimed toward the establishment of absolute values for droplet sizes, etc., and that increases in spray velocity at the start of injection were also shown. The practicability of Lee's tests was questioned by C. L. Allen, and he suggested that in any further experimental work on spray distribution air densities higher than 200 lb. p. sq. in. be used.

Lee, in summing up the discussion, brought out that the small drops, though numerous, do not weigh much in proportion to the total charge, and that while increasing the injection pressure results in better atomization, it gives poorer distribution.

In discussing Dr. Schweitzer's paper, Cummings said that the knocking tendency of a Diesel fuel is a better index of its usefulness than its self-ignition temperature. A. G. Marshall said that the cracking tendency of an oil also is a close index of its self-ignition temperature. W. H. Butler presented results made on eight Diesel fuels to determine the most desirable percentage of saturated hydrocarbons. These tests indicated that the average boiling point was a useful index. R. Haskel brought out that the C/H ratio could not be entirely depended upon as an index of anti-knock quality, since of two fuels having the same C/H ratio one might contain a considerable percentage of octane (anti-knock) and another a similar proportion of iso-octane (pro-knock).

E. Nibbs mentioned that the M.A.N. No. 7 nozzle does not give an initial "spurt," hence conforms to the requirement of releasing a smaller amount of fuel during the first part of the injection period. Common-rail and spring-loaded-valve systems tend to operate otherwise.

Several written discussions of Schweitzer's paper were submitted, among them one by Le Mesurier and by Arthur W. Pope, Jr. of Waukesha. Le Mesurier stated it was necessary to know at what point of the

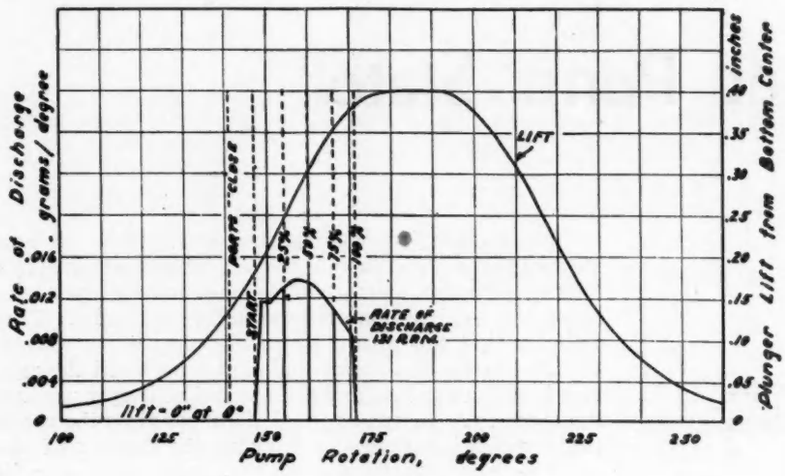


Fig. 2—Curves of pump lift and rate of discharge

piston stroke the knock occurred, to be able to correct it, but that it was exceedingly hard to determine in a small high-speed self-ignition engine. He also confirmed the point that low C/H ratios were an advantage in eliminating Diesel knock. Pope disagreed with some of the correlation factors of Schweitzer but he also confirmed the value of the C/H relationship. He also felt that the critical compression ratio and the gravity of the fuel were valuable aids in studying Diesel knock conditions. Valcranz of Lycoming in a written discussion stated that the viscosity was important, as was cylinder temperature, and he called attention to the variation of octane ratings of fuel with temperature, which he thought had a bearing on Diesel knock problems. For instance, a fuel having an octane number of 84 at 378 deg. Fahr. has a rating of only 70 at 300 deg. Fahr., but the rating becomes 84 again at 212 deg. Fahr.

Kuttner discussed the development of a governor for an Oberhaensli engine mounted in a Mack truck with which he had been experimenting. It was his opinion that fixed timing could not be successfully used on compression-ignition engines for automotive use, and that the solution of the knocking problem (for Diesels) must involve automatic timing. The governor changes the timing as a function of engine speed and is capable of varying it from 5 to 25 deg., while the torque is kept constant within 10 per cent. It was contended that this governor controlled engine performance during the speed range in which knocking occurs and smoky exhaust is likely to occur.

Dr. Dickinson in one of his characteristic summaries said that the Diesel knock problem would be solved if one "gets the stuff ignited before the rest gets in." The relative proportions of saturated and unsaturated hydrocarbons as an index of knocking are not final. The use of amyl-nitrate may also well be considered as a Diesel anti-knock ingredient. The design of the machine itself can also help the fuel problem, it was pointed out.

In concluding discussion of his paper, Dr. Schweitzer said he doubted that the true ignition temperature of the fuel could be determined accurately, and that it was better to attempt to determine ignition lag. He showed that if both smoking and knocking occurred simultaneously, then a governor of the design developed by Kuttner would be ineffective in eliminating these evils.

Recent Work of N.A.C.A. Powerplants Division

AT the Seventh Annual Aircraft Engineering Research Conference held at Langley Field, Va., recently under the auspices of the National Advisory Committee for Aeronautics, Carlton Kemper of the Powerplants Division, N.A.C.A., spoke on recent developments in aircraft powerplants. The tendency in aircraft transportation, he said, is toward higher cruising speeds, and to obtain these higher speeds a reduction in the drag of aircraft structures and an increase in the output of powerplants are necessary.

Aircraft engine manufacturers at present are developing fuel-injection systems to take the place of carburetors. These systems give better fuel distribution, increased power and reduced fuel consumption. With fuel injection into the cylinders, an increase in power output can be obtained by operating with a large valve overlap and using a slight boost pressure in the inlet manifold to scavenge the clearance space of the engine.

The committee, Mr. Kemper said, continued its investigation of engine performance with hydrogenated safety fuels, which reduce the fire hazard. Although the power of the test engine with safety fuel injected into the cylinders was approximately the same as with gasoline drawn in through a carburetor, the consumption of safety fuel at the same power was from 10 to 20 per cent greater.

An investigation was made as to possible methods of decreasing the consumption of the safety fuel, and it was found that the use of a high-temperature coolant was quite effective in this respect.

The effects of operating with improved scavenging and increased valve overlap were investigated on a high-speed Diesel engine, but because of the very small clearance space of the Diesel the increase in power due to complete scavenging is less than with a carburetor engine.

Because of the constant specific fuel consumption for a wide range of throttle settings, the Diesel engine could cruise with clear exhaust at a speed of 13 per cent in excess of that obtained with the carburetor engines and still show an 8 per cent increase in cruising range and a 54 per cent decrease in fuel cost per mile.

The committee is also investigating the factors controlling the transfer of heat from finned cylinders to an air stream. For studying the effect of fin pitch and fin length on the rate of heat dissipation, a method was developed for heating the test cylinder electrically and accurately measuring the energy dissipated.

Although many types of fuel sprays are used in fuel-injection engines, little information is available as to the mechanism by which a solid stream of fuel issuing from an orifice is atomized.

PRODUCTION LINES

Courtesy, Monarch Machine Tool Co.

Easy on Pants

In the interest of cooperation, a well-known clothing manufacturer has tested a number of upholstery fabrics to determine their effect upon clothing. A piece of suiting was rubbed against the upholstery material 100,000 times or what is claimed to be the equivalent of a year's wear. With deep pile mohair velvet, the suiting showed little abrasion—the mohair, none.

Widely Digested

Interested in an industry-wide review of new Bakelite molded products?

Look for it regularly in the *Bakelite Review*, a monthly publication. Ideas on design manufacture, shop hints.

From the Front

Incidentally, the last word is that for cutting steel you use a tool tip of a combination of tungsten and tantalum carbide mixed in proper proportions. Leave the proportions to the makers. Just tell them what your problem is.

Q.E.D

An American Standard for plain and thread plug and ring gage blanks has been approved by the American Standards Association. Developed by the American Gage Design Committee, this standard includes terminology and details of construction for plain cylindrical plug gage blanks and handles; thread plug gage blanks and handles; plain ring gage blanks; and thread ring gage blanks. It also covers taper plug and ring gages for checking taper lock handles and gaging members.

It's a Help

Carboloy has just built a combination handbook and catalog that's a wow. The first part of it gives useful information concerning the design, use, and grinding of tungsten carbide tools. The catalog section shows the many standard and special forms of cutting tools tipped with tungsten or tantalum carbide. Some of the specials may be new to you. They'll be glad to send you a copy if you ask for it.

Production Men

This is your page.

Any suggestions you have on new methods or kinks may be of value to men in other factories.

If you are working on some new development, we'd like to know about it—even if not for publication with your company's name.

Evidently Yes

Our new contemporary, the *ASTE Journal*, for June, 1932, prints a note by E. C. Lee of Chrysler concerning a special reamer he designed recently. The reamer is tipped for about ¾ in. with cemented tungsten carbide. It worked fine but the flutes above the tipped portion wore rapidly. They tried chromium plating and increased production between grinds from 72,000 to 160,000 pieces. Which is an interesting commentary on the article published in *Automotive Industries*, May 21, 1932, p. 748. Look it up if you are interested in the possibilities of chrome plating cutting tools.

The Old Band Wagon

That application of statistical methods to engineering problems is spreading in Europe was reported by Dr. W. A. Shewhart at the annual meeting of the ASTM last week. Pure mathematical theory based on the laws of probability and chance is facing the acid test of practical problems, and has justified itself in a big way in Germany and England. Incidentally, "Student," actively identified with statistical literature is said to be the first to have applied the method to industrial work. His sphere of activity all these years has been (no foolin') Guiness' Brewery, England.

Punch & Die Standards

A proposed American Standard for Punch and Die Sets has been released for distribution to industry for criticism and comment. It covers a liberal range of sizes in five different styles chosen with a view to meeting economically the diversified industrial requirements. Besides the detail dimensions of the die sets proper, guide post lengths, bushing dimensions, design and dimensions of the holding clamps are included.

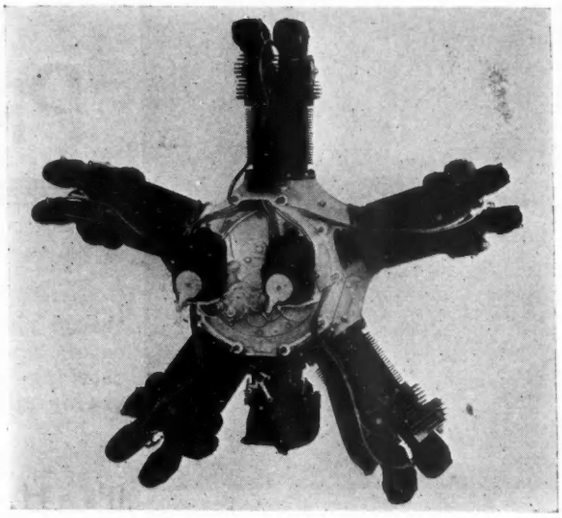
For further information regarding this proposed standard, address Mr. C. B. LePage, Assistant Secretary, A.S.M.E., 29 West 39th Street, New York City.

Improved Products

Why the motorist gets six times the tire mileage possible 15 years ago is explained by J. F. O'Shaughnessy, vp. U. S. Rubber. The program of technical development behind the scenes is discussed in the June issue of the *Executives Service Bulletin.*

MANUFACTURING MANAGEMENT METALLURGY

Light 160 hp. Engine is Developed by Kinner



Kinner Model R-5 engine

A NEW five-cylinder air-cooled radial aircraft engine, the Model R-5, has been announced by Kinner Airplane & Motor Corp., Glendale, Calif. It passed the Department of Commerce Type test and has been awarded Certificate No. 77, with a rating of 160 hp. at 1975 r.p.m. The engine weighs only 305 lb. and is said to be the lightest aircraft engine in its power class built in this country.

The overall diameter is 45¾ in. and the overall length, 32 5/16 in. As the bolt circle for the mounting ring is identical with that of the Kinner Type B-5 engine, it is possible to replace the latter engine where already installed, with the new, more powerful R-5, without changing the mounting ring or cowling.

The R-5, like previous Kinner engines, has a separate camshaft for each of the five cylinders. Each camshaft comprises a spur gear driven by a pinion on the rear end of the crankshaft. Spur-type magneto-drive gears are driven by the cam gears. Oil-pressure and scavenger pumps are driven by shafts keyed into slots in the ends of camshafts Nos. 3 and 4, respectively.

Aluminum-alloy cylinder heads are secured to the forged-steel cylinder barrels by 16 studs each. There are two overhead valves per cylinder, actuated by a valve mechanism completely inclosed with grease-tight rocker-arm boxes and pushrod inclosures. The aluminum-alloy pistons have three compression rings and one oil ring each, all located above the full-floating piston pin. The master connecting rod and the four link rods are made of nickel steel and are machined and polished over their entire surfaces. The nickel-steel crankshaft is machined and ground all over and is counterbalanced. It is carried in two plain babbitt bearings and has a ball thrust bearing fitted to it.

The aluminum-alloy crankcase consists of three sections. The main section carries cylinder base pads, generator and fuel pump mounting pads, induction manifold, rear main bearing and front bearings for cam and accessory driveshafts. The front section carries the front main bearing. The rear section carries the oil pump, the magnetos, and the rear bearings for the camshafts and accessories driveshafts. All oil passages are contained within the crankcase, with the exception of the connections between the oil pump and the oil tank. Lubrication under a pressure of 90-100 lb. p. sq. in. is provided by a gear pump, and a scavenger pump returns the oil from the crankcase to the tank. Oil is led through passages in the crankcase assembly to the front main bearings, thence through the hollow crankshaft to the master rod and rear main bearing; it is supplied under pressure also to the link-rod pins, bushings and from camshaft bearings.

Allis-Chalmers and Cletrac Tractors Tested

THREE additional tractor test reports have been issued recently by the Agricultural Engineering Department of the University of Nebraska. Report No. 200 covers the Allis-Chalmers Model L, a tracklayer-type tractor with a six-cylinder 5¼ by 6½ in. engine governed at 1050 r.p.m. The test tractor with operator weighed 22,027 lb. The highest rating under standard rating codes is 60.02 hp. drawbar and 80.48 belt. In the maximum-load test the engine developed 91.83 b. hp. at 1048 r.p.m. with a specific fuel (gasoline) consumption of 0.714 lb. p. hp.-hr. The tractor has no less than six forward gear speeds. Speeds made in the so-called maximum-load test in the different gears were as follows: 1.88, 2.41, 3.01, 4.11, 5.19 and 6.48 m.p.h., and the corresponding drawbar pulls were 15,086, 11,826, 8985, 6299, 4697 and 3263 lb.

Test No. 201 was on a Cletrac 25, manufactured by the Cleveland Tractor Company. This also is a tracklayer type of tractor and is equipped with a six-cylinder engine of 3¾ in. bore by 4½ in. stroke, governed at 1250 r.p.m. The highest rating permissible under standard rating codes is 21.52 drawbar hp. and 30.35 hp. belt. In the tests the engine developed a maximum of 33.11 hp. at 1250 r.p.m. with a specific fuel consumption of 0.682 lb. p. hp.-hr., the fuel being gasoline. The tractor has three forward speeds and in the maximum-load test it developed speeds of 1.89, 2.78, and 3.99 m.p.h., with corresponding drawbar pulls of 5206, 3613 and 2191 lb. The total weight of the tractor as tested, with operator, was 7275 lb.

Official test No. 202 was made on a Cletrac 15, another tracklayer type with a four-cylinder 4 by 4½ in. engine governed at 1250 r.p.m. The weight with operator was 6100 lb. The engine developed a maximum horsepower of 26.94 at 1250 r.p.m., with a specific fuel consumption of 0.690 lb. p. hp.-hr. In the maximum-load test the tractor developed speeds of 1.77, 2.76 and 3.99 m.p.h., with corresponding drawbar pulls of 4444, 3008 and 1887 lb. The maximum rating of this tractor in accordance with standard rating codes sponsored by the S.A.E. and the A.S.A.E., is 17.75 drawbar hp. and 24.44 belt hp.

Nebraska Tests Farmall F-30 Tractor

I.H.C. product with 4-cyl. engine, bore and stroke 4¼ by 5 in., has number of auxiliary units produced by the company. Kerosene used in all test runs. Machine develops drawbar pull of 2520 lb. at 3.11 m.p.h.

TRACTOR test No. 198 of the University of Nebraska was made on a McCormick-Deering Farmall F-30 tractor, manufactured by the International Harvester Co., Chicago. This tractor is equipped with a four-cylinder, vertical, valve-in-head engine of 4¼-in. bore and 5-in. stroke, the rated speed of the engine being 1150 r.p.m. The port diameter is 1.697 in. for the inlet and 1.479 in. for the exhaust valve. The engine is equipped with a belt pulley of 14⅝ in. diameter and 7 in. face, which turns at 682 r.p.m. The carburetor is a 1¼-in. Zenith, and ignition is by a magneto of the tractor manufacturer's own make. A centrifugal governor of the company's own make is employed. Lubrication is by the circulating splash system. An air cleaner of the oil and fiber type is furnished with the tractor.

The chassis is of the four-wheel type, with the engine mounted lengthwise on it, and the drive is through enclosed gearing. The clutch is of the manufacturer's own make, of the dry, single-plate type, and is operated by foot. The transmission affords four forward speeds, the advertised speeds being 2, 2¾, 3¼ and 3¾ m.p.h. Drive wheels are 42 in. in diameter and 12 in. wide, and they are provided with 24 spade-type lugs each, 5 in. high by 3½ in. wide. Extension rims 6 in. wide are furnished with the tractor, and these come with twelve lugs per rim, of the same size as those used on the wheels. The seat is of pressed steel. The total weight of the tractor with driver was 5990 lb.

The Farmall F-30 tractor in action

Kerosene was used as fuel in all tests. That used in the brake tests weighed 6.76 lb. p. gal., and that used in the drawbar tests, 6.78 lb. p. gal. The total amount of oil supplied to the engine was 6.949 gal. and the amount drained from the crankcase, 7.825 gal. The oil was drained to the middle cock and refilled to the top cock after approximately each 10 hr. of operation. After 55 hr. all of the oil was drained, and again at the end of the test. The total duration of engine operation was 66 hr.

In the maximum load test (brake horsepower), which extended over one hour, the engine developed 32.80 hp. at 1150 r.p.m., with a specific fuel consumption of 0.704 lb. p. hp.-hr. In the rated load test, also one hour, the engine developed 30.31 hp. at 1150 r.p.m. with a specific consumption of 0.742 lb. p. hp.-hr. In the varying load test, consisting of six runs of 20 min. each, the engine consumed 1.558 gal. per hour when developing 0.73 hp. and 3484 gal. per hour when developing 33.92 hp.

In the rated drawbar-load test for ten hours in second gear the tractor developed a drawbar pull of 2520 lb. at 3.11 m.p.h., corresponding to 20.88 drawbar hp., with a fuel consumption of 1.024 lb. p. hp.-hr. The air temperature was 79 deg., and the temperature of the water leaving the engine, 175 deg. The water consumption 0.053 gal. per hour.

In the maximum drawbar load test the tractor developed a drawbar pull of 4157 lb. at 2.24 m.p.h. (24.85 hp.) in first gear, with a wheel slip of 9.70 per cent; 2953 lb. at 3.04 m.p.h. (23.93 hp.) in second gear, with a wheel slip of 6.54 per cent; 2327 lb. at 3.71 m.p.h. (23.04 hp.) in third gear, with a wheel slip of 5.23 per cent; and 1849 lb. at 4.46 m.p.h. (22.00 hp.) in fourth gear, with a wheel slip of 4.34 per cent.

The pin which holds the splined end of the steering rod in the splined sleeve sheared off twice, once during the "limber-up" run, and again during the rated-load drawbar test. Each time the pin was replaced by another. No claims or statements were found in the advertising literature which were unreasonable or excessive. The maximum permissible rating of this tractor under the recommendations of the A.S.A.E. and the S.A.E. tractor rating codes is 20.27 drawbar hp. and 30.29 belt hp., according to the specifications in the test report.

Continuous Gas Ovens Bake Enamel

THE line of automobile trim and moldings has been so well developed by the Randall Company, Cincinnati, Ohio, that practically every manufacturer of automobiles, trucks, buses, coaches, bodies, etc., and some makers of furniture, in the United States, use the Randall line of trimmings or molding. All of the items put out by this company were designed and developed in its own engineering department and these same engineers evolved and built the machines that today are producing these products on a mass production basis.

The raw materials consist of rubber, rattan, or reed, strip steel and the finished products are roughly divided into three groups, (1) roof molding, (2) door trim and panel binders, and (3) upholstery molding.

Extruded rubber or rattan forms the core of upholstery molding. These two products are first dressed in machines specially designed to form, shape and finish them. The upholstery material or fabric is held to the core by a clincher of strip steel. This is made in a specially built machine which is fed continuously with a roll of strip steel of the correct width and, as it passes through, dies cut a series of notches on both edges. These form small tabs and sharp-pointed triangles which later serve as clinchers for both the core and fabric.

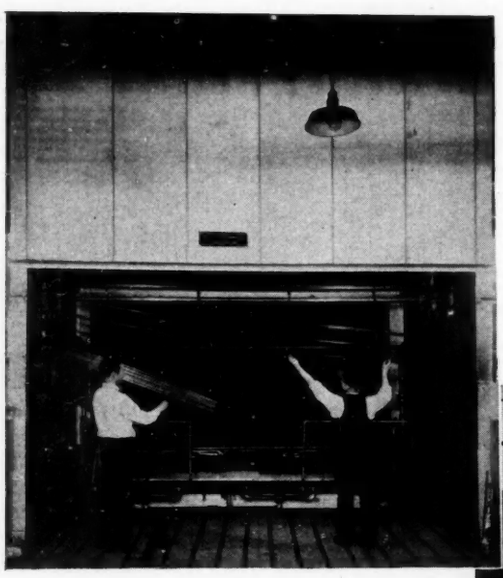
In the clinch core department is a battery of machines to which are fed the already formed clincher strips and either rattan or rubber, both at the same time. The first operation of the machine is to space, place and weld sharp-pointed nails onto the clincher strip, while in the next the tabs are bent down around the core and the triangles turned up at right angles, ready for the fabric covering machines. These machines are all individually motor driven and the rubber is fed to them in coils in 500 ft. lengths while the rattan is cut to the length ordered by the purchaser.

Molding and trim, with the nails welded on and ready to be mounted in place by the customer, is a development unique to the trade and is put out by this concern solely.

Machines for covering Clinch Core are loaned by the company to users of their molding. A simple hand operated machine will cover the core at the rate of one hundred feet per minute with any material desired, leather, imitation leather, fabric or lace. Material cut to width is fed into the covering machine along with the core, and is firmly and neatly clinched around it.

The roof molding division is equipped with machines which automatically form and cut off to proper lengths the strip steel as it is fed through from coils. Other machines automatically space, place and weld the nails onto the strip. An important feature incident to the welding of the nails onto the strip is that they are welded onto the bottom side in such a manner as to leave the top and exposed side of the strip absolutely smooth. The finished molding is then thoroughly scoured and wiped clean and given two coats of flexible black enamel and each coat is baked on in a gas-fired oven.

This oven is constructed of sheet steel, well insulated; it is automatic and continuous in operation both as to baking period and temperature control. For moving the pieces of roof molding through, there is a chain conveyor with rods from which are suspended fixtures onto which the work is placed. The conveyor is motor-driven through sprockets and a speed reduction gear train, and by regulating the speed the correct baking periods are maintained. The conveyor rises in the back of the oven, makes six vertical passes by festooning and descends on the front side to the point of beginning where a section is cut away from the front wall below



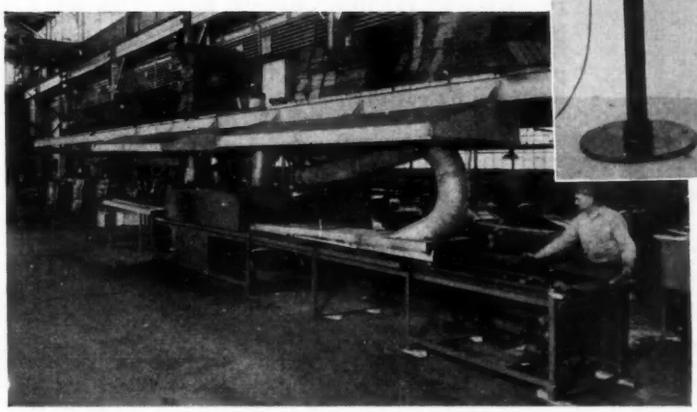
Continuous oven, with chain conveyor, for baking enamel on trim material

Below—View in one of the Randall Company manufacturing departments

on Trim and Moldings

J. B. Nealey* describes production methods in automobile supply plant equipped for big output schedules

Simple hand-operated machine for covering molded trim



Combination washer and dryer used to prepare roof mold strips for enameling

the oven proper, for loading and unloading.

The upper portion of the oven is partitioned off from the loading section with a sheet steel partition so as to prevent the cold air from filtering in. Directly below the oven is a steel tank holding 1600 gal. of enamel which is continually circulated by pumps through strainers. As the work is loaded onto the conveyor it descends, so that the work will pass through the tank, where it receives the first coat of enamel and then up into the oven proper where it is baked on. It descends a second time and receives the second coat which is also baked on in the oven and the finished work is then removed as it is passing the unloading station.

Heat is supplied through two gas burners firing into the oven, just above the partition. These burners consist of two combustion chambers each, one entering the oven through the wall and the other entering the first at an angle. There is a motor-driven fan in the outer end of the first combustion chamber and a rotary mixer on the opposite extension of its shaft. Gas and air are mixed in this mixer and forced into the second combustion chamber where it is fired into the first combustion chamber. Air for secondary combustion is forced into the first combustion chamber by the fan and the whole fires directly into the oven.

The automatic temperature control consists of a potentiometer with recorder which actuates, by compressed air, an on-and-off valve in the gas supply line. This valve is attached to a diaphragm and is maintained in the open position as long as air pressure is maintained on the under side of the diaphragm. This air is supplied from a motor-driven compressor. It is started and stopped by rise and fall of air pressure.

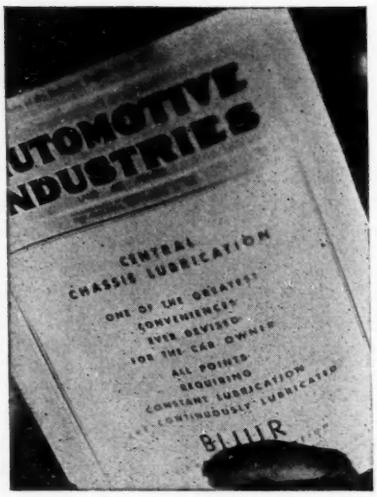
Roof molding strips after the nails are welded on must be thoroughly cleaned preparatory to applying the two coats of japan. For this a combination washer and dryer was installed which utilizes steam from a gas-fired steam boiler to heat the cleaning solution. The washer is about 10 ft. long and jets spray against the work which is scrubbed with revolving brushes as it passes through on a continuous conveyor consisting of parallel chains and cross bars. At the charging end is a loading table to rest the work on while the operator pushes it onto the conveyor. At the discharge end are two air pipes, one above and one below the work which emit jets of compressed air against the work to remove surplus moisture. The washer conveyor projects 15 ft. beyond the washer at the discharge end, and two-thirds of this is covered with a small drying oven of sheet steel which is only from 4 to 8 in. high, and through which the strips pass.

Waste heat from the flue of the gas boiler is blown into this oven to dry the work. A motor is used on the pump that forces the cleaning fluid through the jets, one to operate the conveyor, one forcing the hot products of combustion into the dryer, a fourth on the exhaust fan which sucks up any fumes through hoods placed over the ends of the washer, and a fifth for the scrubbing brushes. The steam pressure in the boiler is mechanically maintained which renders it automatic and continuous in operation so that no operator is required.

Panel Binder is made up in another department with rows of machines fed by strip steel in coils which give the strip a "U" shaped turn. It is then passed through the nailwelding machines which spot weld the nails to one side.

This material is furnished in cut lengths to fit the customer's specifications and some of it is afterwards curved to fit the "dog leg" portion of rear doors. Panel Binder is a reinforcement for the cardboard automobile door panel, and offers a concealed means of fastening the complete panel to the door, the upholstering material having previously been hooked over the nails on the under side.

*American Gas Association.



Effect of Location of Oil Groove on Bearing Load Capacity

Editor, AUTOMOTIVE INDUSTRIES:

In view of the present discussion in the U. S. A. and elsewhere as to the correct design of automotive bearings, I submit the following for your consideration.

It appears that a bearing such as the big end of a connecting rod depends entirely on its lubrication for satisfactory performance.

All plane surfaces supported on fluid do actually support a load in proportion to their speed, i. e., the faster the speed the greater the load carried. This holds for planes on air or water, and therefore presumably on oil.

This would appear to decide one factor in the carrying capacity of bearings, but in order that a bearing may carry a load in proportion to its speed, it is obviously essential that the oil must be fed at all times into the point of application of the load in a proper manner.

A Michell thrust block depends for its success on the fact that the center of pressure of the load is behind the center of area supporting that load, and it would appear that this bearing should carry a load in proportion to its speed.

Have you any information on this point? No confirmation of this is available here at the moment.

In a big-end bearing the conditions are somewhat similar to the Michell thrust block in that the point of contact in the crankshaft remains (at high speed) roughly in the same relation to the normal oil feed hole in the crank during the complete cycle. It would appear therefore that a big-end bearing *should* support a load in proportion to speed, and the fact that in practice it does not, points in my view to a fault in the manner of supplying the oil to the surface of the bearing.

In a normal design of bearing, the oil is fed into a bearing which has an unbroken surface except for the groove along the joint of the halves. This certainly spreads the oil across the width of the bearing but not necessarily where the load is, except twice during one revolution of the crank. It would appear that because the hole in the crank remains in approximately the same position with relation to the point of application of the load that greater use of this fact should be made.

If a groove be cut in the *crank* across the width of the bearing, this would insure oil being fed across the full width of the bearing at the correct place all the time*, and we have some preliminary evidence that such is the case, as the lubrication of one particular bearing has definitely been improved by cutting such a groove in the crank of an unsatisfactory bearing.

P. A. POPPE,
Coventry, England.

The parallel between an airplane or an aquaplane on the one hand and a lubricated bearing on the other does not seem to be a valid one, for the reason that in the case of the planes the load-carrying capacity is dependent upon the inertia of the sustaining medium, while in the case of a lubricated bearing it is the viscosity of the lubricant that is depended upon.

In the usual bearing-testing arrangement the load is always in the same direction and these tests invariably show that as the speed of rotation of the journal is increased, the sustained load-carrying capacity is decreased. This results from the fact that with increase in speed the frictional loss increases, and the greater heat generated in the bearing reduces the viscosity of the lubricant and therefore its load-carrying capacity.

Mr. Poppe's suggestion to place the oil groove in the crankpin instead of in the big-end bearing is interesting, and it is quite likely that this would result in an increase in the crankpin-bearing capacity. The load on the crankpin is always substantially in the same direction, on the inner side of the pin, but it rotates with relation to the connecting-rod big end. Therefore, to assure conditions of oil supply to the bearing somewhat similar to those obtaining in a Michell bearing, where the oil is introduced at the line of minimum loading, the transverse groove for oil distribution over the width of the bearing evidently must be in the crankpin. We should like to hear from any of our readers who may have had experience along this line.—*Editor.*

*The correct place for the oil groove is on the slack side of the bearing, which, so far as big ends are concerned, is on top of the crankpin; the oil is fed from within the crankshaft to this groove.

The

Two-Stroke Design Is Criticized

Editor, AUTOMOTIVE INDUSTRIES:

On page 887 of your June 18 issue reference is made to "a *new* two-cycle engine." The writer was shown an identical design in 1906 and condemned it for definite technical reasons, and as a result the idea was abandoned. What are the defects?

The piston extension by which the charge is transferred reduces the effective area of the piston; consequently, for a given power output, the diameter of the piston must be made larger. That means a hopeless combustion space, due to the increased wall area, and consequent added heat loss during the expansion stroke.

Charge transfer and exhaust-inertia conditions present another hopeless situation. The two-cycle engine is a problem in that the charges are hard to control even when conditions are ideal and fuel and charges are equally distributed in a multi-cylinder engine. If for any reason one cylinder fails to deliver its share of the power developed, one of the results will be that the inertia of the exhaust from this cylinder is reduced. The cylinder developing the greatest amount of power exhausts with the greatest inertia, and, in consequence, draws more than its share of the volume of fresh charge available.

Conditions are bad enough when each cylinder has its own crankcase, owing to differences in the exhaust inertia. For instance, if one cylinder misfires, the demand for a recharge to the crankcase is disturbed and the familiar tendency to "four-cycle" makes itself apparent.

In the engine illustrated by you, there is a common crankcase for both cylinders, and that alone will condemn the design, even disregarding such other disadvantages as heavy pistons, off-center connecting rods, one cylinder getting all of the oil due to crank action, piston thrust on the bottom of one cylinder (perhaps the one getting the least oil), and the other piston exerting its side thrust on the upper side of the bore.

Assuming that charging of the combustion chamber is due to crankcase pressure, and that the pressures at both inlet ports before they are opened are equal, if one cylinder has delivered more power for any reason, the inertia of the exhaust from it will be greater; this results in a greater vacuum in that cylinder. As a result,

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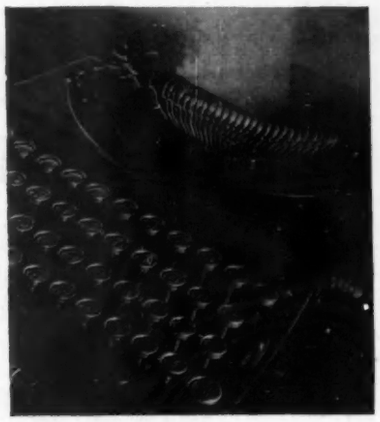


that cylinder takes a greater charge, and it will persist in doing so, thus impairing the action of the weaker cylinder. The latter then cools down, and may stop firing altogether, due to being robbed of charge by the other "pirate" cylinder.

JAMES MCINTOSH.

Finds Operation Economies Of Small Interest in U. S.

Editor, AUTOMOTIVE INDUSTRIES:

Mr. Norman G. Shidle's article in the May 28 issue, "The Little Giant," was of particular interest to me, as I was connected in a consulting way with the manufacture of a small car from the start until the factory was on a production basis.

I followed the initial show job through its public introduction in New York, Chicago, Detroit and on the Pacific Coast, and at that time was greatly surprised at what seemed to be the popular enthusiasm for it. Due to the fact that its British sister had been in production for several years and had had an opportunity to eliminate the inevitable service difficulties, it was considered wise to duplicate the chassis as far as was possible.

As we processed the car, it was believed possible that great economies could be made in the future by a systematic elimination and simplification program.

The initial factory cost of the job was high. There is no question about that. There were many pounds of aluminum castings which might have been replaced without adding greatly to the weight, and, of course, at a tremendous saving. Furthermore, the design and quality of certain parts were such that they could not be produced in an economical manner.

It is not generally recognized, unless an analysis is made, how great a proportion of total cost is represented by a well-coached and well-painted body. From our experience it seems reasonable to say that the motor using public is not yet prepared to accept any less pleasing body lines or any paint job which is inferior to the ones which they may expect on the low priced cars of the present day.

The truth is that the motor using public never accepted the small automobile in quantity production lots, in spite of the proven economies which were shown time and again, not only by factory tests but by users as well. Several of them were driven clear from the Atlantic to the Pacific Coast at total cost of less than $30.00, but this fact, which should have proven excellent sales ammunition, seemed to carry little weight with prospective buyers.

It seems as though the public were held back from the purchase of these cars for two reasons. First, they were afraid that the small car would be an unusual accident risk on the highways, and secondly, that the education of the motorist on this side has never been directed along lines of economical operation.

Even the average working man would prefer to run his old second hand car at a time when money is available to buy gasoline and oil, and let it stand in the garage when he does not happen to be able to keep it running.

I have had the opportunity of looking over at least two designs which I am sure would be fairly satisfactory from a mechanical point of view, and whose simplicity is such that they could be built and marketed for about $325 if a volume sale as large as 300 per day could be assured. There is considerable doubt in my mind as to whether this volume can be assured even with the present depletion of national income. Style, performance and super-abundance of power still hold a major influence in the minds of the motoring public.

Very truly yours,
R. K. HAVIGHORST,
Consulting Engineer.

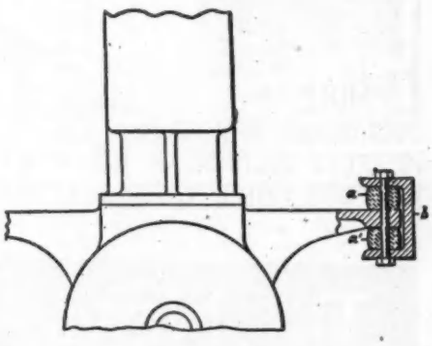
Flexible Mounting Back in 1901

Editor, AUTOMOTIVE INDUSTRIES:

In connection with Mr. McGaffin's inquiry appearing at the bottom of page 888 of the June 18 issue of *Automotive Industries,* I call attention to the article by Hugh D. Meier appearing in the *Horseless Age,* Nov. 6, 1901, pages 652 and 653. A mounting of this character was also described in United States patent No. 786349, issued April 4, 1905, to J. F. Duryea.

ARTHUR CALVER.

One of the illustrations from Mr. Meier's article is reproduced herewith. The object which he aimed at in recommending a flexible mounting for



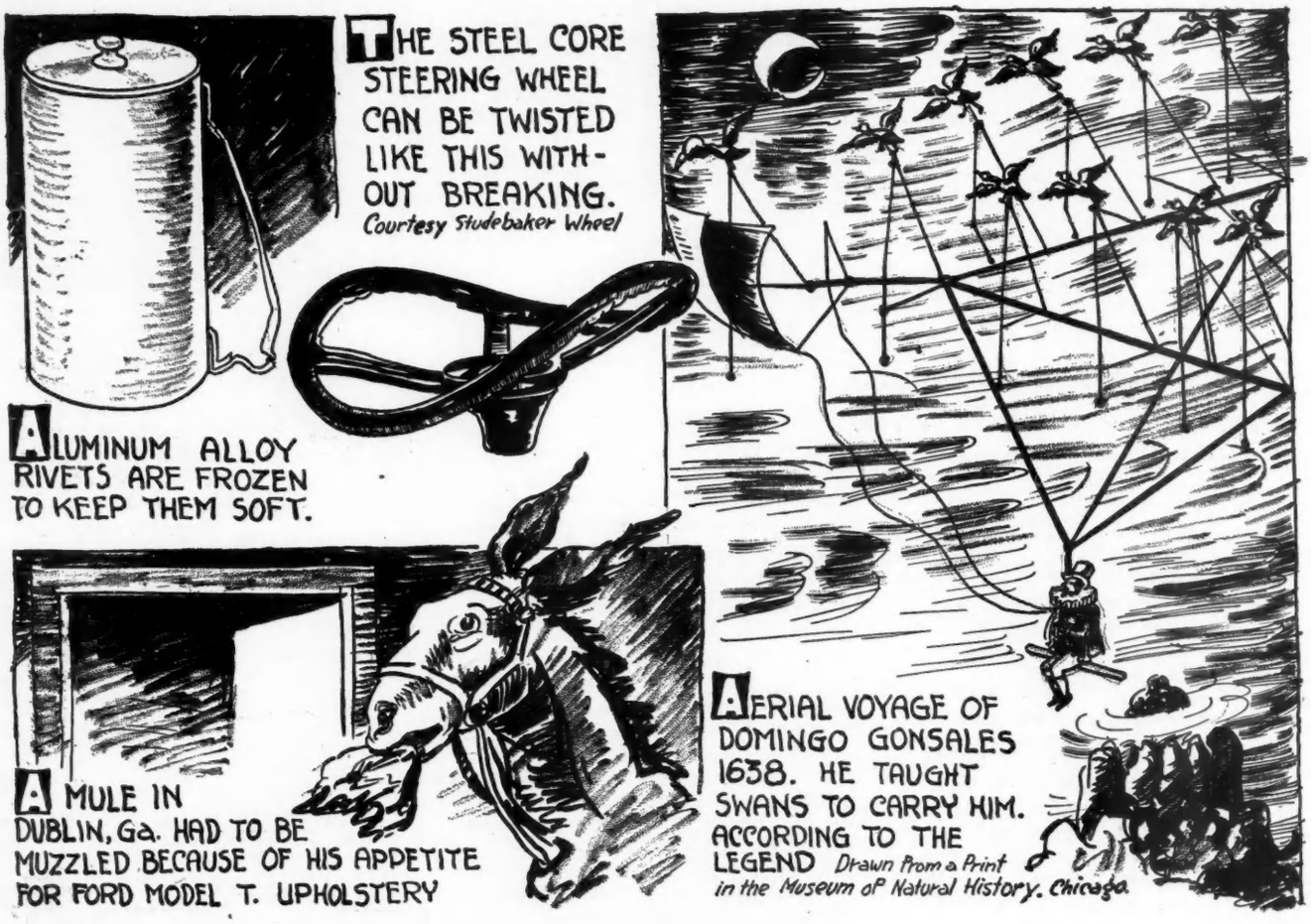
the engine was to reduce the shocks on tires due to inertia of the load on them. Following is an excerpt from the article:

"Figs. 1 and 2 show methods of attaching a motor to an angle and a channel iron frame respectively. In both cases a bolt runs through the rubber buffers a and a_1 and the hub b of the engine brackets.

"At the other end the bracket may form a sleeve held between buffers, the same as on the end shown or form a pivot bearing attached to the carriage frame or sills of the body, provided that the latter are heavy enough. The writer does not advocate the use of flat pieces of rubber ½ to ¾ in. thick, which cannot possibly cushion shocks like a properly designed buffer, of the type shown in Fig. 3."

The figure referred to shows a barrel-type buffer of a length one-and-one-quarter times its maximum diameter and a hole through it of a diameter equal to one-quarter the maximum outside diameter.—*Editor.*

Automotive Oddities—By Pete Keenan



The News Trailer

Write us if you know an oddity

On the occasion of a recent meeting of the Society of Automobile Engineers in France, at which he presented a paper on Micheline's pneumatic-tired railcars, M. Pierre Bourdon-Michelin told a story bearing on the increase in the speed of means of transportation. He said that in 1895, after the Paris-Bordeaux race, which had been won at an average speed of 25 kilometers (15.5 miles) per hour, at the banquet concluding the race, the president, M. Marcel Deprez, member of the Institute, who was always an enthusiast, raised his glass to "the first who shall make 100 kilometers (62.5 miles) per hour." At that moment the manufacturer who had won the race, who was seated next to Andre Michelin, turned to him and said in subdued voice: "It is strange, at the end of a banquet there is always someone who has drunk a little too much and then gets up and makes foolish remarks."

The speaker also told how the rubber-tired railcoach came to be known as the Micheline. It was at first proposed to use a compound word embodying the elements auto, pneumatic, and rail, but all of the terms suggested were too technical and not likely to become popular. When the car was presented to the directors of the large railway systems, one of them, comparing the frail, graceful and almost feminine form of the rubber-tired coach with the mastodons of railway equipment, suggested the name Micheline (the feminine personal name corresponding to Michel or Michael). M. Bourdon-Michelin said a number of austere technicians had deplored that a technical advance was promoted under such a frivolous name. On the other hand there was no lack of people who thought the choice a very happy one. Some of those had advised the firm that they had named the latest addition to their family "Micheline," and asked that the firm pay the baptismal dues.

—P. M. H.

Questions arise from time to time concerning the mileage life of an airplane. One Ford tri-engined plane, operated on the Ford Air Lines, has just completed 400,000 miles, representing five and a half years of service and the carriage of something like 6,000,000 lb. of freight. The plane was originally equipped with Wright J-4 engines. When the manufacture of these was discontinued, J-6 engines were installed. Ford pilots expect the plane to outlast still another set of engines. Quite a record, that, but not the longest.

NEWS

Tax Rules Set On Oil & Gas

Bureau of Internal Revenue Issues 10 Points in Reports

WASHINGTON, June 27—The Bureau of Internal Revenue issued on June 25 the regulations appearing below relative to the collection of Federal taxes on lubricating oils and gasoline. Regulations 44 of the Bureau of Internal Revenue relating to the taxes on lubricating oil and gasoline contain instructions for keeping records that have not been required heretofore. The regulations in that respect are as follows:

Every person required to file a return and pay tax on the use or sale of any article covered by these regulations must keep accurate records and accounts with respect to such use or sale. The record shall contain an inventory of all of the taxable articles on hand at the opening of business June 21, 1932 (the effective date of the taxes imposed under Title IV). For the period June 21 to June 30, 1932, inclusive, and for each calendar month thereafter, records must be maintained showing:

(a) quantity on hand at beginning of month;
(b) quantity produced;
(c) quantity purchased tax free;
(d) quantity purchased tax paid;
(e) quantity sold tax free;
(f) quantity sold subject to tax;
(g) quantity used in production of other taxable commodities;
(h) quantity used otherwise;
(i) actual wastage, evaporation, and other losses, etc.; and
(j) quantity on hand at end of month.

Such records must be retained for a period of at least four years from the date the tax became due, or, in the case of tax-free sales, for a period of at least four years from the last day of the month following the sale, and must be available for inspection at all times by internal-revenue officers. The books of every person liable to tax shall at all times be open for inspection by Government officers.

Any person liable to tax on the articles named in Regulations 44 who wilfully fails to keep proper and accurate records is subject to a fine of $10,000, or imprisonment, or both, with costs of prosecution, and is also liable to a penalty equal to the amount of the tax not paid. These penalites apply to an officer or employee who, as such officer or employee, is under a duty to perform the act in respect of which the violation occurs, as well as to a person who fails or refuses to keep the records.

Dodge Deliveries Up

DETROIT, June 29—Dodge retail deliveries of passenger cars and trucks for week ending June 25 increased 31.2 per cent over previous week and registered gain of 47.9 per cent over same period last year, and was the highest week since last August.

Packard Names Stewart

Willis T. Stewart, formerly Packard distributor in Lexington, Ky., has been named special sales representative for Packard.

DeSoto Appoints Creeger

A. E. Creeger has been appointed Boston district manager for DeSoto, succeeding F. L. McNulty, who resigned.

DeSoto and Plymouth

DETROIT, June 29—Sales of DeSoto and Plymouths by DeSoto dealers last week reached new high with total of 2008 cars, which is 10 per cent increase over best previous week—last week in April—and 100 per cent increase over corresponding week last year. Used car sales during last week totaled 1725 against 1140 for same week last year.

Eynon's Duties Changed

Benjamin G. Eynon, Commissioner of Motor Vehicles for Pennsylvania, has been detailed by Governor Pinchot to be in charge of the recently formed Street and Highway Safety Committee of the state government. Mr. Eynon will retain the title of commissioner, but the detail work of the Bureau of Motor Vehicles will be handled by R. H. Stickel, who will have the title of director of the bureau.

Reduces License Fees

SAINT JOHN, N. B., June 29—Reduction of automobile registration license fees by 20 per cent, effective July 1, was announced here today by Premier C. D. Richards after a meeting of the provincial government.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

NEW YORK, June 29—The weather was unfavorable for retail business throughout the country last week, with the exception of the South. The increase that occured in some sections was due for the most part to buying to avoid payment of the new excise taxes. While the recent legislation has aided in dissipating the pall of gloom, the anticipated improvement in business levels has not yet appeared.

CAR LOADINGS

Railway freight loadings during the week ended June 11 totaled 501,760 cars, which marks a decrease of 230,649 cars below those a year ago and a decrease of 424,306 cars below those two years ago.

DEPARTMENT STORE SALES

Department store sales in the metropolitan area of New York during the first fifteen days of June were 24 per cent below those in the corresponding period last year, according to a report of the Federal Reserve Bank of New York.

EMPLOYMENT LEVEL

The level of employment in 16 major industrial groups in May, according to the Bureau of Labor Statistics, was 3.2 per cent below that in April, while total payrolls decreased 3.9 per cent.

COTTON SPINNING

There were 31,737,174 cotton spinning spindles in place at the end of May, of which 21,639,352 were operated at some time during the month, as against 23,409,246 during April and 26,379,082 a year ago.

CRUDE OIL OUTPUT

Average daily crude oil production for the week ended June 18 amounted to 2,197,550 barrels, as against 2,183,450 barrels for the week before and 2,482,350 barrels a year ago.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices for the week ended June 25 stood at 59.5, as against 59.3 the week before and 59.6 two weeks before.

BANK DEBITS

Bank debits to individual accounts outside of New York City during the week ended June 22 were 23 per cent below those a year ago.

STOCK MARKET

The stock market last week was extremely dull. Some of the specialties turned sharply lower, but, on the whole, fluctuations were within a narrow range. There were again numerous dividend reductions and omissions. The volume of trading was very small and did not reach a million shares on any day. Most issues showed moderate net losses for the week.

RESERVE STATEMENT

The consolidated statement of the Federal Reserve banks for the week ended June 22 showed decreases of $8,000,000 in holdings of discounted bills and of $12,000,000 in holdings of bills bought in the open market. Holdings of Government securities increased $38,000,000. The reserve ratio on June 22 was 57.8 per cent, as against 57.9 per cent a week earlier and 59.4 two weeks earlier.

Work of Bureau Veritas Described; French Body Examines Aircraft

Certificates of airworthiness for French aircraft and engines are issued by the Bureau Veritas, according to information from a reliable source, which goes on to describe the work of the bureau as follows: The organization, originally a registry of ships, founded in 1828, has its administrative headquarters at Paris. In 1922, at the request of the French government, the Bureau Veritas created a classification register of aircraft. In that same year it established a technical control over the construction and operation of aircraft as a basis for the issuance and renewal of airworthiness certificates. To carry out this control its activity was directed particularly to the examination of materials, analysis of gasoline and oils, and the verification of quality.

The technical section of the Bureau Veritas publishes aeronautic regulations periodically, usually annually. It publishes also each year, with semi-annual supplements, an aeronautic register giving information concerning civil aircraft in service. Information pertaining to registration, ownership, base, number of crew, seating capacity, empty weight and weight when loaded, flying radius, type, date and place of construction, variations from prototypes, engines, fuel capacity, installations, hours of flight, repairs and inspections is included.

Representatives of the Bureau Veritas inspect periodically aircraft under construction or those in service which are being repaired. Aircraft used for public transport and by flying schools are under permanent inspection. The same inspection is required of engines. Builders of aircraft, or aircraft engines, as well as purchasers and owners shall request inspection of the aircraft by the Bureau Veritas, whose approval is indicated by certificates, reports made after inspection, visaed documents, etc.

Classified aircraft is indicated by a letter V on the register. Such classification remains valid as long as there is no deterioration of the flying characteristics, if it is not used for any purpose not indicated at the time of inspection, and if periodic inspections are made. After any serious accident, listing of the plane by the Bureau Veritas is automatically suspended and repair must be made under the supervision of a representative of the Bureau Veritas. After the aircraft is repaired and pronounced satisfactory an accredited rating is given. No aircraft may carry a greater load than that indicated on the classification certificate or on the airworthiness certificate, nor be used for acrobatic flying nor be remodeled in an essential characteristic without being removed from the register until it again complies with regulations.

Private aircraft must be inspected at least every six months, while all aircraft used for transportation of passengers, mail or goods for any remuneration whatever must be inspected four times a year. When aircraft is inspected all documents, such as airworthiness certificates, registration certificates, log books, etc., must be made available to the inspector. Parachutes are subject to the same inspection as planes and engines. They must be presented unfolded for inspection and then refolded by a competent person.

Effective August, 1930, the Bureau Veritas was given authority to issue certificates of airworthiness. These are issued by the central administration at Paris on presentation of a legalized brief containing a photograph, side view, of the aircraft showing its registration marks, Bureau Veritas certificates showing registration of plane and engine and attestation that the aircraft conforms to the prototype or that all changes are authorized.

Receivers Named for Durant Motors

DETROIT, June 27—The Central Trust Co. of Lansing and H. F. Herbermann have been appointed receivers for the Durant Motors, Inc., by Federal Judge Edward J. Moinet on the petition of the Ajax Investment Co. of Toledo, one of the creditors. Assets were listed in the petition at $15,000,000 and the receivers were instructed to take immediate charge of the company's holdings in Lansing.

Airwheels Optional on Plymouth

DETROIT, June 29—Low pressure balloon tires of the "airwheel" type are now optional equipment on Plymouth cars at $50 extra, including five special wheels, four tires, and chassis changes.

Wilcox Reports Profit

DETROIT, June 28 — Wilcox-Rich Corp. has reported net profit of $42,483 for the quarter ended March 31, 1932, after dividend requirements on Class A stock, compared with net profit of $139,644 in the same period last year. Dividend on Class B stock due at this time has been omitted.

Federal Body Business Up

DETROIT June 27—The body division of Federal Motor Truck Co., Detroit, has reported a 70 per cent increase in business over a similar period last year.

Traffic Group Flays Proposal

Moves Against Resolution of Some Regional Shippers Advisory Boards

DETROIT, June 27 — Resolutions adopted by some of the shippers regional advisory boards, calling for legislation that would place trucking rates under Federal regulation, were termed "improper and unethical" in a resolution adopted by the traffic group of the National Automobile Chamber of Commerce, meeting at Detroit, June 21.

While heretofore the boards have handled only subjects dealing with function of railroad car service and were organized for that purpose only, several of them have now declared for regulation of truck rates. The Car Service Division of the railroads has given publicity to the resolution, which has also been circulated extensively among legislators, notwithstanding protest from those opposed to such regulation.

The resolution follows:

Whereas, A number of the Shippers Regional Advisory Boards have recently discussed subjects other than car service matters and in some cases have passed resolutions favoring legislation that would restrict shippers' use of highway services, and

Whereas, These Board meetings of Railroads and shippers were organized as a cooperative medium for the purpose of improving rail freight services, and

Whereas, The expenses of the Boards and publicity emanating from their activities were in the first instance, and still are, sustained by the railroads, and

Whereas, The Traffic Managers of the automobile industry have been glad to participate in the original purpose of the several boards through their membership, attendance at the meetings, and reports, and

Whereas, The Directors of the National Automobile Chamber of Commerce have resolved: "That the National Automobile Chamber of Commerce is opposed to the extension of Federal rate-making powers over intercoastal, coastwise and inland water-borne traffic and trucking as unsound and unnecessary and favors a liberal attitude toward rail carriers in regulatory matters, including every reasonable opportunity to meet competition,"

NOW Therefore Be it Resolved: That our members oppose the passing and circulating of resolutions embarrassing to other services and as emanating from shippers as improper and unethical.

Air Commerce Rules Amended

The period of validity of an approved type certificate issued by the Department of Commerce to aircraft manufacturers for the construction of aircraft, is limited to two years with provisions for renewal annually thereafter, under an amendment to the Air Commerce Regulations announced today by Colonel Clarence M. Young, Assistant Secretary of Commerce for Aeronautics. Heretofore such a certificate was not limited to a definite period.

Approved type certificates are issued as a matter of convenience to manufacturers of aircraft of the same type, in quantities. When a manufacturer has secured an approved type certificate for a certain type aircraft, then each one manufactured in that type is eligible for license by the Department of Commerce following certain inspection requirements.

The amendment which is substituted for Section 11(B), in the Air Commerce Regulations, and Paragraph 7 of Section 4, in the Airworthiness Requirements of Air Commerce Regulations for Aircraft, is as follows:

"An approved type certificate is valid for a period of two years from date of issuance and may be renewed annually thereafter upon request, provided that suitable manufacturing facilities are being maintained and that aircraft which conform with the Airworthiness Requirements to the satisfaction of the Secretary have been manufactured in accordance with the terms of the certificate during the preceding year. In the event, however, that good cause exists for the continuance of the certificate the Secretary may, at his discretion, waive the necessity for aircraft having been constructed under the certificate during the preceding year provided that, in any case, satisfactory manufacturing facilities are being maintained. The request for renewal shall include a statement, supported by affidavit, showing the number of airplanes constructed in exact accordance with the terms of the approved type certificate since its issuance or latest renewal, together with their respective serial numbers and dates of manufacture."

Chevrolet Names Carr

C. C. Carr has been appointed head of the dealer accounting department of Chevrolet Motor Co., according to an announcement by H. J. Klingler, vice-president and general sales manager. Mr. Carr, for the past year and a half, has been assistant manager of this department.

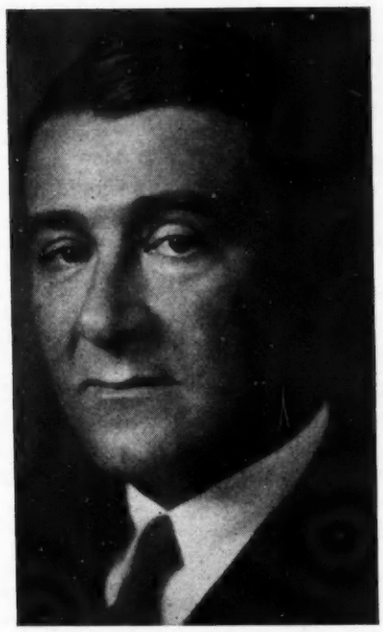
He succeeds J. E. Johnson, who has returned to the field as manager of Chevrolet's Baltimore zone, replacing J. F. Murphy. Murphy now heads the Los Angeles zone, succeeding P. F. Minnock, who is on an indefinite leave due to illness. A. W. Famular will serve as assistant dealer accountant.

Graham Passes Dividend

DETROIT, June 28—Graham-Paige Motors Corp. has reported that the regular quarterly dividend of $1.75 on preferred stock due at this time has been omitted.

C. K. Brauns Dies in Detroit at 48; Headed Chilton Class Journal Office

DETROIT, June 27—C. K. "Curt" Brauns, 48, since 1913 a representative of Chilton Class Journal publications, died yesterday.



Born in Milwaukee on July 9, 1883, Mr. Brauns joined the circulation staff of *Horseless Age* about 1904, working in the Indianapolis territory. He was soon promoted to the sales staff and became acquainted with many of the pioneers of the industry who at that time were manufacturing their products in central Indiana, Ohio and Illinois.

In 1910 he joined the sales staff of the Class Journal Co. and three years later began his work with the Chilton Co. These companies were merged in 1923, forming the Chilton Class Journal Co.

As manager of the Detroit office of the Chilton Class Journal Co. he was widely known throughout the industry and had the personal friendship of many of the leading executives of the automotive industry. Having been in ill health for some months, he was on a leave of absence at the time of his death.

He was a member of the Detroit Athletic, Bloomfield Hills Country, Players and Scarab Clubs.

He is survived by his widow, Mrs. Edna McDougall Brauns, whose home was in Chicago before their marriage.

Funeral services were held Wednesday in Chicago. Among his friends who attended were C. C. Winningham, Henry Ewald, Benjamin G. Koether and Clare Wight.

Perfect Circle Gains in Canada

TORONTO, June 29—Perfect Circle Co., Hagerstown, Ind., reports a gain of 38 per cent in Canadian sales for the first five months of 1932 over the same period of 1931, setting a new all-time Canadian record. Sales for the month of May showed a gain of 48 per cent over the same month of last year. Perfect Circle piston rings are now being manufactured in Canada, a new plant having been established in Toronto only a few months ago. The Jos. St. Mars organization, with offices at Vancouver, B. C., Winnipeg, Man., Toronto, Ont., and Montreal, Que., are the sole agents for these rings in the Dominion of Canada.

Canada's Gasoline Sales

OTTAWA, June 29—An increasing demand for data regarding gasoline consumption in Canada has made it necessary for the government to compile and issue monthly statements on the sales of this commodity.

Sales of gasoline in January amounted to 29,966,387 gal., and in February 24,157,750.

By provinces the February sales were: Ontario, 12,863,830 gal.; Quebec, 4,249,359; British Columbia, 2,368,861; Alberta, 1,800,608; Manitoba, 1,081,013; Saskatchewan, 780,450; Nova Scotia, 606,693; New Brunswick, 380,681; Prince Edward Island, 26,075.

Jones Leaves Goodrich

Dr. Webster N. Jones, general superintendent of the processing division of the B. F. Goodrich Co., will leave the company Aug. 1 to become director of engineering of Carnegie Institute of Technology at Pittsburgh. Dr. Jones joined Goodrich in 1919 as a research chemist, and in 1925 was placed in charge of the production chemical laboratories and the training of young technologists.

Goodyear Promotes Hamlin

Harry B. Hamlin has been promoted from manager of the credit department to assistant treasurer of the Goodyear Tire & Rubber Co. Mr. Hamlin has been with Goodyear since 1905, when he became the twenty-seventh office employee of the company.

World's Petroleum Resources Discussed

IN a communication to the (French) Society of Civil Engineers, M. Brunschwig discussed the petroleum-production statistics of recent years, which he summarizes as follows:

1. The world's annual production of crude oil is approximately 200 million tons (metric tons of 2204 lb.). The relative importance of this figure in the fuel industry may be appreciated by its approximation to the world's production of coal, which amounts to about a billion tons per year, after having reached 1,300,000,000 tons in 1928.

2. The United States holds first place among producing countries by a wide margin; in 1931 their contribution was 62.1 per cent; it was 68 per cent in 1928, and attained a maximum of 71.5 per cent in 1925.

3. Second place, with 11.6 per cent, belongs to Russia, which even as recently as 1930 was still behind Venezuela.

4. In 1931 the aggregate production of the United States, Russia and Venezuela amounted to 82.4 per cent of the total world production, as compared with 82.3 per cent in 1930 and 82.3 per cent in 1928. The relative decrease in the production of the United States was compensated for by the increases in the production figures of Russia and Venezuela.

5. After these three leading producing countries, not a single country produced as much as 4 per cent of the total.

As regards petroleum consumption, the statistics may be summarized as follows:

1. The United States again heads the list, with a consumption of 70 per cent of the total.

2. If we limit ourselves to gasoline, which quantitatively surpasses all other petroleum products in importance, we find that the United States in 1931 consumed approximately 75 per cent of the total.

The aggregate consumption of the five great consuming nations (United States, England, Canada, France and Germany) exceed 90 per cent of the total.

In the matter of consumption, M. Brunschwig calls attention to the displacement of coal by petroleum fuels, especially in the powerplants of ocean vessels and in certain stationary heating plants. As regards the former, he feels that a reversal of practice is not likely, but with regard to the latter he holds the opinion that certain abnormal developments of recent years in industrial and domestic heating, which were due primarily to disturbances in the petroleum market and consequent abnormal price declines, will be corrected in time.

Up to 1929 the curve of the world's annual petroleum production followed very closely that of American production, both curves being of exponential form.

Starting in 1929, the world's production, which had reached a figure of 212,266,000 tons, decreased until it reached 195,757,000 tons in 1931.

It seems that this decrease in production cannot be logically ascribed to the economic crisis, in view of the fact that in the United States and the other principal consuming countries there had been no decrease in consumption until 1931. Over-production was caused, on the one hand, by the development of cracking, which permits of obtaining twice as much gasoline from a given amount of crude oil as ten years ago, and, on the other, by the loss of export markets by the United States to countries such as Russia and Roumania.

In Mexico, a very rapid development in production from 1910 to 1921 was followed by a continuous decline, and there seems to be no hope of any future forward movement due to the discovery of new fields.

In Venezuela, production is increasing very rapidly, and so far has been confined mainly to the environs of Lake Maracaibo. It seems that that country is holding out considerable promise.

In Russia, where production was reduced to 3,500,000 tons by the revolution, it has jumped ahead again to 23 million tons in 1931, which placed that country in second place among the world's petroleum producers. It should be pointed out, however, that this increase in production is due almost exclusively to the two fields of Apcheron and Grosny, and that efforts of the Soviet authorities to discover other important fields have not yielded any satisfactory results up to the present.

In Roumania, recent discoveries justify the hope that the production of the Roumanian plains will continue at its present rate.

In Persia, petroleum production, which is completely under the control of the Anglo-Persian Petroleum Company, has been stabilized by means of a rigorous production program at 6,000,000 tons per year.

The World's Reserves

The world's established coal reserves are evaluated as being equal to more than 700 years of consumption at the present rate; the possible or probable reserves as equal to more than 4000 years.

As regards petroleum reserves, on the contrary, most of the estimates, made principally in the United States, have proved much too low, and successive estimates were increased at the same rate as production itself increased.

Whether the world's reserves will last for fifty or a hundred years, according to the estimates of different experts, and whether improvements in the methods of prospecting and exploitation will yield new sources of unexpected magnitude are questions regarding which one can be guided only by sentiment, opines M. Brunschwig.

A CATERPILLAR 25 has been tested by the Agricultural Engineering Department of the University of Nebraska and the results of the tests are given in Official Report No. 203. This tractor, which is being manufactured by the Caterpillar Tractor Company of Peoria, Ill., is equipped with a four-cylinder valve-in-head engine of 4 in. bore by 5½ in. stroke which is governed at 1100 r.p.m. A single-plate dry clutch, operated by hand, is fitted, and the transmission gives three forward speeds and reverse of nominally 1.8, 2.6, 3.6 and 2.0 m.p.h. respectively. The tractor is of the track-layer type with tracks 16.46 ft. long and 11 in. wide each. The total weight of the tractor with driver ready for the test was 8087 lb.

In the maximum-load test (1 hour) the engine developed 32.97 hp. at 1100 r.p.m. with a fuel consumption (gasoline) of 0.631 lb. p. hp.-hr. In the rated-load test of the tractor, in second gear (10 hours), it developed a drawbar pull of 3366 lb. at a speed of 2.53 m.p.h., corresponding to 22.74 drawbar hp., and consumed 0.810 lb. of fuel p. hp.-hr. The highest rating permissible under standard rating codes is 22.07 hp. drawbar, 29.94 hp. belt.

Firestone Gets Regular Dividend

Company Increases Prices on Solid Tire Lines Only

AKRON, OHIO, June 28—The Firestone Tire & Rubber Co. made a net profit of $1,639,739 for the six months ending April 30, 1932, after deducting all interest charges, federal taxes and Liberian expenses, Harvey S. Firestone, Sr., chairman of the board of the company, announced here. The profit is based on the business of the manufacturing plants and all subsidiaries, including Firestone service stores, the report said.

Directors of the company meeting here last Friday declared the regular dividend of 25 cents a share on common stock of the company, payable July 20 to stockholders of record July 5.

Profit of the last six months compares with a profit of $2,908,553 for the same period last year.

The company has increased its list price on solid tires 11 per cent, which is identical with the increases in this line of tires made by other companies here when the new federal tax went into effect June 21.

Firestone refused to join other companies in raising prices on its entire line until the mail-order houses revise their listed prices in catalogs now in the hands of customers. Other companies in the industry boosted all tire prices 11 to 15 per cent to meet the tax costs.

Solid tires are not being sold in large quantities by mail-order houses, and are not listed in the regular catalogs of the larger mail-order companies, Firestone officials have pointed out in explanation of their upward revision of prices on these tires at this time.

Issues New Pamphlet

The New Devices Section of General Motors Corp. has just published a new edition of its pamphlet, "New Devices Activities of General Motors," which describes in detail how the corporation gives consideration to inventions and patents submitted to it by non-employees. Copies of the pamphlet may be obtained by addressing the secretary of the New Devices Section, General Motors Corp., at the General Motors Building in Detroit.

Hudson Distributors May See New Car

DETROIT, June 29—Hudson distributors from all parts of the country have arrived at the factory for a meeting during the week of June 27 to discuss business possibilities for the remainder of the year. It is also reported that some definite information will soon be forthcoming on the new product which rumor has connected with Hudson and Essex for the past few weeks.

There is a general feeling throughout the industry that an entirely new and advanced type of small car is soon to make its appearance, and it has also been reported that the Hudson company will be the first to introduce this new transportation unit.

Sterling to Acquire La France-Republic

The Sterling Motor Truck Co. has completed negotiations for the acquisition of the motor truck division of the La France-Republic Sales Corp. of Alma, Mich. Current assets acquired by Sterling in the transaction, in excess of liabilities, amount to more than $1,000,000.

E. M. Sternberg, president of Sterling, said the lines of both companies would be continued, with Sterling producing heavy-duty trucks, while La France-Republic would continue to build light and medium capacity trucks. He said that while Sterling's sales were lower than last year, the company was maintaining its position in the industry, and was prepared to take full advantage of any improvement in conditions.

Handy Names Two

The appointment of R. C. Darnell as chief engineer and the promotion of C. R. Richmond to production manager are announced by Arthur A. Bull, president of the Handy Governor Corp.

Willys Begins Work

TOLEDO, June 27—John N. Willys, chairman of the board of Willys-Overland Co., plunging back into active duty here today addressed a group of dealers here at the plant this morning and then left with L. A. Miller, president, for Chicago to talk to another group of about 200 dealers in the evening.

He announced that 5000 men are now employed in the plant here and orders are picking up.

Continental Reports Loss

DETROIT, June 28—Continental Motors Corp. and subsidiaries has reported for six months ended April 30, 1932, a net loss of $1,026,660.

B. O. P. Names Arnold

O. L. Arnold, formerly vice-president and director of sales for General Motors Truck Co., has been appointed regional manager of the Midwest region, including the Detroit territory, of Buick-Olds-Pontiac Sales Co.

Briggs Dividend Passed

DETROIT, June 27—Briggs Mfg. Co. has reported that the quarterly dividend will be omitted.

August Set For Steel Rise

Ford Buying Currently Takes Fifth of Sheets

NEW YORK, June 30—Very little quickening in the pace of steel market activities is looked for in July, but a turn for the better is expected to develop early in August. Meanwhile some of the Middle West finishing mills catering to parts-makers are continuing to make fair-sized deliveries of sheets, strip and wire. It is estimated that Ford orders have been absorbing a fifth of the recent output of the sheet industry. Just when Ford schedules will undergo a change is the unknown quantity that causes as much speculation among sheet producers as it does among parts makers.

Strip mills are very much in the same position. Demand for strip during the first half of June was slightly better than it has been in the last two weeks and in some mills operations have tended further downward. The situation in the market for cold-finished and automotive alloy bars is little changed. The new quantity extras applying to the former are now in full effect. Entailing neither an advance in price nor any other inconvenience to representative buyers, the only objection comes from small consumers who must either step up their orders or buy from jobbers and pay the latter a profit. One of the leading interest's Youngstown plants is down until after the holiday and other seasonal suspensions of a week or so are likely to become more or less general. Prices are holding their own.

Pig Iron—Fresh buying by automotive foundries is in abeyance. Prices for foundry and malleable are unchanged. The price of certain alloys has been trimmed, spiegeleisen being down $2 and ferromanganese $7 a ton.

Aluminum—The market is dull and unchanged. Reduction in the rate of duty announced from Washinton for certain compositions into which aluminum enters pertain to certain ferro-silicon-aluminum and ferroaluminum silicon alloys used to deoxidize molten steel and not to alloys of aluminum and silicon used structurally in the automotive industries.

Copper—Quiet and featureless. A fair volume of orders for rolled copper and brass products is reported to have been booked recently from consumers who are convinced that the bottom of the market has been reached and that any change at all must be in an upward direction.

Tin—Fractional ups and downs make for a traders' market without attracting many consumers. Straits opened the week at 19.20 cents.

Lead—Demand light. Price unchanged.

Zinc—Dull and steady.

Gabriel Names Beecher

John J. Batterman, president of the Gabriel Co. of Cleveland, announces the appointment of Eugene L. Beecher as chief engineer. Mr. Beecher has been with the Gabriel Co. as research engineer.

Exports, Imports and Reimports of the Automotive Industry For May and Five Months Ended May, 1932-1931

	Month of May				Five Months Ended May			
	1932		1931		1932		1931	
	Number	Value	Number	Value	Number	Value	Number	Value
Automobiles, parts and accessories	....	$7,864,671	.....	$14,173,979	.....	$39,218,997	.....	$81,124,567
Motor trucks, buses and chassis (total)	1,505	837,746	4,498	2,454,146	10,946	5,135,748	24,831	13,202,037
Under one ton	117	32,105	396	132,988	1,204	312,106	4,319	1,548,516
One and up to 1½ tons	1,055	478,683	3,562	1,595,269	8,343	3,296,701	17,512	7,970,585
Over 1½ tons to 2½ tons	340	193,073	296	364,334	952	777,558	2,020	2,123,172
Over 2½ tons	80	119,903	199	321,985	368	639,993	779	1,432,741
PASSENGER CARS								
Passenger cars and chassis	3,604	2,294,036	8,468	5,516,609	23,011	13,534,520	48,995	29,930,539
Low price range, $850 inclusive	2,886	1,499,887	6,400	3,212,532	19,262	4,154,334	38,708	18,386,825
Medium price range over $850 to $1,200	390	363,235	1,338	1,296,658.	2,178	2,101,929	6,561	6,283,374
$1,200 to $2,000	165	216,833	322	455,170	786	1,035,205	1,676	2,431,493
Over $2,000	71	175,636	171	450,155	421	1,100,871	926	2,348,600
PARTS, ETC.								
Parts, except engines and tires	....	.....	.....	.....	.....	.....	.....	.....
Automobile unit assemblies	....	2,813,309	.....	3,048,503	.....	11,257,417	.....	22,175,429
Automobile parts for replacement (n.e.s.)	....	1,139,665	.....	2,390,894	.....	5,646,803	.....	12,269,481
Automobile accessories	....	154,138	.....	339,953	.....	924,734	.....	1,757,423
Automobile service appliances (n.e.s.)	....	192,634	.....	306,128	.....	855,170	.....	1,615,860
Trailers	13	4,332	36	27,045	73	53,832	464	141,147
Airplanes, seaplanes and other aircraft	16	153,325	11	165,451	56	578,202	47	586,290
Parts of airplanes, except engines and tires	....	95,852	.....	87,438	.....	406,916	.....	804,529
BICYCLES, ETC.								
Bicycles	33	951	154	3,529	397	9,653	774	20,076
Motorcycles	165	39,837	514	130,267	1,218	271,539	3,571	872,445
Parts and accessories, except tires	....	32,023	.....	70,983	.....	157,640	.....	284,108
INTERNAL COMBUSTION ENGINES Stationary and Portable								
Diesel and Semi-Diesel	8	47,367	7	17,992	20	109,312	146	153,021
Other stationary and portable:								
Not over 10 hp.	472	26,925	690	48,550	1,785	119,066	4,198	326,932
Over 10 hp.	60	40,827	1,375	521,912	274	186,209	2,611	1,210,633
Automobile engines for:								
Motor trucks and buses	269	30,272	1,027	155,616	1,215	187,036	3,912	575,774
Passenger cars	4,583	283,393	2,717	205,868	12,865	1,046,546	11,482	967,206
Tractors	3	14,958	3	1,101	8	16,374	8	3,503
Aircraft	44	38,567	18	77,957	131	311,910	113	557,417
Accessories and parts (carburetors)	....	117,535	.....	188,822	.....	568,556	.....	1,059,037
IMPORTS								
Automobile and chassis (dutiable)	42	14,212	75	106,400	181	135,373	249	339,179
Other vehicles and parts for them (dutiable)	....	6,303	.....	4,857	.....	20,534	.....	25,440
REIMPORTS								
Automobiles (free from duty)	14	18,270	9	3,275	54	57,864	74	67,760

Airship Institute Dedicated in Akron

AKRON, OHIO, June 28—A new $350,000 Guggenheim Airship Institute which will be devoted exclusively to the problems of the lighter-than-air industry was dedicated here Sunday and yesterday.

The Guggenheim Foundation for Aeronautics gave $250,000 and the City of Akron gave $100,000 to construct and operate the institute. The new institute building is located at the Akron Municipal Airport near the Goodyear Zeppelin hangar where the U. S. Macon, sister ship of the U. S. Akron, is now under construction for the U. S. Navy.

The new institute will be operated jointly by Akron University and the California Institute of Technology. It will be the only institute in the world devoted exclusively to the study and assembly of facts concerning lighter-than-air problems.

The new building houses the largest vertical wind tunnel in the world, built at a cost of $30,000, and capable of testing the effect of air currents up to 125 m.p.h. on aircraft models.

The air stream is created by a four-blade propeller fan driven by a 225 hp. motor, which is connected with a special set of electrical machines to enable adjustment of air speed from zero to the top speed and to keep the air speed constant at a desired value.

The wind tunnel is a large tube varying from six to 14 feet in diameter, 60 feet high and shaped like a huge capital "C." It is built of sheet metal, a departure from previous tunnels of this size, which have been of wood or concrete.

Models to be investigated in the vertical air jet will be connected with special hydraulic gages to show the forces acting upon them. Other investigations, such as studies of heat transmission, airflow texture, etc., can easily be carried out, as all models will be accessible from all sides during the tests in the open air jet.

A small wind tunnel is available also for developing and testing instruments. A tower will be built on the roof for meteorological purposes, to carry the instruments necessary for the investigation of air conditions.

A structural testing room has been built and will be equipped with modern structural testing machines.

Research work to be undertaken will be based on the immediate needs of the airship industry and on problems in fundamental science.

For the next five years the institute will be operated under the scientific supervision of California Institute of Technology which has appointed Dr. Theodor Von Karman as director. Dr. Von Karman also is director of the Guggenheim Aeronautics Laboratory of Pasadena, Cal. Dr. Theodor Troller is assistant director with residence at Akron University.

Federal Welder Books Orders, Adds Engineers

WARREN, OHIO, July 1—New orders for electrical resistance welding equipment placed with the Federal Machine & Welder Co. have necessitated the enlargement of the company's engineering department, officers report. Among the added personnel are Arthur Mallett, formerly chief engineer, Thomson Gibb Co., Bay City, Mich., and Clyde Coates, formerly engineer with Taylor-Winfield Corp.

Franklin Shipping 12's

First shipments of seven-passenger supercharged twelve sedans are being made by the Franklin factory this week. The list price of the new sedan is $3,985 f.o.b. factory.

E. H. Brown Returns

Edwin H. Brown, mechanical engineer, A. O. Smith Corp., Milwaukee, has returned from a tour of eight months in France, Germany and Russia.

June Advertising Takes a Fall

May Radio Total, However, Continues Gains

Advertising expenditures by the automotive industry in national magazines and national farm magazines during June fell approximately forty per cent behind the expenditures for the same month a year ago. The total was $1,201,860, a decline of 40.9 per cent from $2,033,631 spent in June, 1931. National magazines accounted for $1,127,940 of this total, off 39.9 per cent, and national farm magazines accounted for $73,920, off 53.0 per cent. Of the total in national magazines, $746,760 went for passenger cars and trucks, $195,752 went for tires and tubes, and $185,428 went for accessories, according to figures compiled from National Advertising Records by the business survey department of Dorrance, Sullivan & Co., New York.

The half-year figure for national magazines was $8,271,559, 13.3 per cent under the figure of $9,539,726 for the first six months of 1931. The six months total for farm magazines was $574,246, a loss of 39.7 per cent as compared to $952,078 last year.

Radio broadcast advertising over national networks continued to gain during May. The expenditure for this medium amounted to $230,255, a gain of 154.3 per cent over the May, 1931 total of $90,556. The radio expenditure for the first five months of the year was $1,188,544 ahead of last year by 111.4 per cent.

May Vehicle Production in U. S. 185,149; Canadian Output Reaches 8221 Units

May factory sales of automobiles manufactured in the United States (including foreign assemblies from parts made in the United States and reported as complete units or vehicles), based on data reported to the Bureau of the Census, consisted of 185,149 vehicles, of which 157,683 were passenger cars, 27,393 trucks, and 73 taxicabs, as compared with 148,326 vehicles in April, 317,163 vehicles in May, 1931, and 420,027 vehicles in May, 1930.

The table below is based on figures received by the Bureau of the Census from 144 manufacturers in the United States for recent months, 42 making passenger cars and 113 making trucks (11 making both passenger cars and trucks). Figures for passenger cars include only those designed as pleasure vehicles, while the taxicabs reported are those built specifically for that purpose. Figures for trucks include ambulances, funeral cars, fire apparatus, street sweepers, and buses. Canadian figures are supplied by the Dominion Bureau of Statistics.

NUMBER OF VEHICLES

	United States				Canada		
	Total	Passenger Cars	Trucks	Taxicabs†	Total	Passenger Cars	Trucks
1930							
May	420,027	360,928	58,659	440	24,672	21,251	3,421
1931							
May	317,163	271,135	45,688	340	12,738	10,621	2,117
1932							
January	119,344	98,706	20,541	97	3,731	3,112	619
February	117,418	94,085	23,308	25	5,477	4,494	983
March	118,959	99,325	19,560	74	8,318	6,604	1,714
April	*148,326	*120,906	*27,389	31	6,810	5,660	1,150
May	185,149	157,683	27,393	73	8,221	7,269	952
Total 5 Months (Jan.-May)							
1930	1,864,074	1,574,888	285,021	4,165	95,595	81,165	14,430
1931	1,322,295	1,105,916	213,923	2,456	59,257	47,228	12,029
1932	689,196	570,705	118,191	300	32,557	27,139	5,418

*Revised.
†Includes only factory-built taxicabs, and not private passenger cars converted into vehicles for hire.

Develops Vacuum Fan Driving Motor

A vacuum fan motor, operated by the vacuum in the inlet manifold and designed to circulate air through a hot-water heating coil in closed cars, has been developed by the Delta Corp. of Detroit.

The motor is of the centrifugal or turbine type and is said to drive the fan at about the same speed as an electric motor at car speeds of 45 m.p.h.

At speeds below 35 m.p.h. the vacuum motor is said to drive the fan even faster than an electric motor. An obvious advantage of this type of fan is that it does not drain the storage battery.

Robert Martindell

Robert Martindell, sales manager of the American Forging & Socket Co., Pontiac, Mich., died June 21, after a brief illness. Mr. Martindell had occupied the position of sales manager since 1925, the year he went to Pontiac. He was born in Hamilton, Ohio, and was in his sixty-third year at the time he died.

New Uruguayan Tariff Rules

The Government of Uruguay on April 11 passed a law according to which chassis of automobiles, trucks and buses when imported into that country, are exempt from payment of duty in gold. An additional duty of 50 per cent is placed on bodies of automobiles, trucks and buses, and parts of same, whether mounted on a chassis or imported separately. However, the duty on body parts is remitted if the parts are imported by a firm which operates within the country an important establishment (judged on the basis of equipment and number of men employed) specially adapted for the assembling of automobiles, buses and trucks, and completing their manufacture.

B. O. P. Names Johnson

Courtney Johnson, who has been on the staff of R. H. Grant, General Motors Corp., has been named assistant general sales manager in charge of sales promotion for Buick-Olds-Pontiac Sales Co. Mr. Johnson recently returned from a business trip to Europe. Mr. Johnson was formerly general sales manager of the Hudson Motor Car Co.

Gets Byrd Orders

NEW HOLSTEIN, WIS., June 27—The Arps Corp. has received an order from Admiral Richard E. Byrd for two "snowmobiles" with caterpillar tracks and runners for the second Byrd expedition to the Antarctic leaving Boston about Sept. 1. The equipment is built for extreme cold, sometimes reaching 90 deg. below zero. The bodies are specially insulated and the rear axle equipment is provided with heating coils to keep the lubricant liquid. The Government also has ordered a snowmobile unit for the inspection service along the Arctic coast with headquarters at Point Barrow, Alaska.

Purchasers Elect Russell

E. E. Russell, J. I. Case Co., Racine, Wis., has been elected president of the Milwaukee Association of Purchasing Agents. The new vice-president is Sam Wilson, Kearney & Trecker Corp., Milwaukee. E. O. Jones, Belle City Malleable Co., Racine, was elected secretary; G. L. Hartman, Oilgear Co., Milwaukee, national director, and H. A. Frank, Sterling Wheelbarrow Co., Milwaukee, local director.

Lining Prices Up

W. J. Parker, commissioner for the Asbestos Brake Lining Association, New York, announces that the Association has voted to revise brake lining and clutch facing lists slightly upward.

The Association has decided to absorb excise taxes commencing July 1.

Position of Automotive Securities on the New York Exchange (June 1) From the June Bulletin of the N. Y. S. E.

NAME OF GROUP	COMMON STOCKS					PREFERRED STOCKS				ALL STOCKS			
	No. of Companies	No. of Issues	Average Price	Total Shares Listed	Total Market Value	No. of Issues	Average Price	Total Shares Listed	Total Market Value	No. of Issues	Average Price	Total Shares Listed	Total Market Value
Automobile & Truck Mfg. Co.'s (and Holding Co's)	22	22	$6.10	83,175,732	$506,973,362	7	$53.68	2,363,475	$126,873,239	29	$7.41	85,539,207	$633,846,601
Automobile Access. Mfg. Co's (and Holding Co's)	35	35	3.86	22,563,060	87,097,582	5	16.11	297,409	4,791,289	40	4.02	22,860,469	91,888,871
AUTOMOBILE INDUSTRY .....TOTAL	57	57	5.62	105,738,792	594,070,944	12	49.48	2,660,884	131,664,528	69	6.69	108,399,676	725,735,472
FARM MACHINERY INDUSTRY..TOTAL	7	6	9.81	8,086,516	79,297,376	5	25.31	3,144,750	79,601,494	11	14.15	11,231,266	158,898,870
RUBBER TIRE & GOODS INDUSTRY .....TOTAL	8	9	4.13	9,680,221	40,023,267	12	19.16	2,662,637	51,011,128	21	7.38	12,342,858	91,034,395
Petroleum & Natural Gas Co's	42	46	9.08	177,036,257	1,606,902,493	12	33.81	2,176,832	73,601,872	58	9.38	179,213,089	1,680,504,365
Petroleum & Natural Gas Holding Co's....	1	1	1.50	1,235,823	1,853,735	..	..	..	..	1	1.50	1,235,823	1,853,735
PETROLEUM INDUSTRY .....TOTAL	43	47	9.02	178,272,080	1,608,756,228	12	33.81	2,176,832	73,601,872	59	9.32	180,448,912	1,682,358,100
AIRPLANES-A'WAYS-A'PORTS ..TOTAL	8	8	2.48	16,746,142	41,502,314	1	7.28	1,381,359	10,052,039	10	2.84	18,127,501	51,554,353
Omnibus Operating Co's	3	3	4.55	1,085,339	4,935,388	1	55.00	88,863	4,887,465	4	8.37	1,174,202	9,822,853

Widia Carbide Tool Prices Reduced

Thomas Prosser & Son, New York, American representatives of Fried. Krupp A. G., of Essen, Germany, announces a general price reduction of from 10 to 50 per cent on all Widia cemented carbide tools and tips, effective July 1.

The company has inaugurated a new service, supplying "milled and brazed" tools. These tools are furnished brazed complete ready for grinding, which can easily be done by the customer. Substantial savings can be effected by the use of this service, especially in the case of small size Widia tipped bits, and when it is not necessary to have the fine finish and careful grinding which is put on the standard tools.

This price reduction means that it is possible to use tungsten carbide on many applications where the tool cost was previously considered excessive. As the reductions are especially great on the larger tips and tools, heavier tools for more severe duty can be employed to great advantage.

These prices are effective on all grades of Widia, including the new Widia "X," which is proving very successful for machining steel. This new grade permits the use of much higher cutting speeds and the elimination of cratering or cupping out of the top of the tool which was previously encountered with hard metal compositions when machining steel.

No Airworthiness Conference This Year

The usual annual conference with aircraft manufacturers relative to projected revisions in the Airworthiness Requirements of Air Commerce Regulations for Aircraft will be omitted this year unless there is some unexpected development, according to an announcement today by Col. Clarence M. Young, Assistant Secretary of Commerce for Aeronautics. It has not been found necessary to propose any major changes to the regulations this year, Col. Young explained, and the Aeronautics Branch believes that the few points under consideration are of insufficient importance to justify the expense to the industry of a general conference.

The few proposed changes to the regulations that are now being drawn up will be mailed to manufacturers for their comments. The manufacturers have been invited to forward any criticisms that they may have, and the Aeronautics Branch will welcome discussions with them, either by correspondence or by direct contact.

L. G. S. Shipments Up

INDIANAPOLIS, June 29—May shipments of L. G. S. free wheeling unit springs totaled 64,912, as compared with 53,897 for the month of April, and 3520 for May, 1931, W. C. Starkey, president of the L. G. S. Devices Corporation, division of Cord Corporation, announced today.

Shipments during the first six months of the 1932 fiscal year ending May 31, totaled 301,277 units, which compares with 25,037 for the first six months of 1931 and 97,189 for the entire fiscal year, Mr. Starkey said.

Milwaukee Ford Schedule

MILWAUKEE, June 27—The July schedule of the Milwaukee Ford plant as announced by W. E. Simons, branch manager, calls for an increase in the output of the new V-8 from 40 units daily to 66. Production of 4-cylinder cars will drop from 58 a day to 30. The July schedule, however, calls for the construction of more bodies and commercial items, so that the present force of 900 will remain about the same. The Milwaukee situation is not national insofar as 4-cylinder production is concerned, it being understood that other Ford branches will continue to assemble the present number in July.

Firestone to Have Exhibition Building

The Firestone Tire & Rubber Co. will erect a special building at Chicago's 1933 World's Fair.

+ + CALENDAR OF COMING EVENTS + +

FOREIGN SHOWS

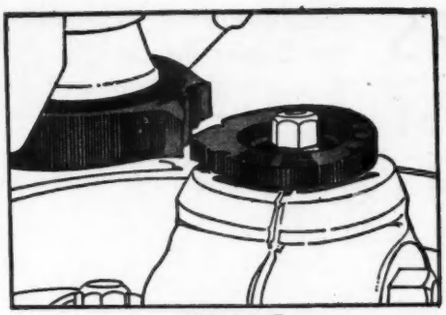
Southampton, Commercial .....July 5- 9
Llandrindod, Wales, Commercial July 20-22
London, Olympia Show .....Oct. 13-22
Glasgow, Scottish Motor Show..Nov. 11-19

CONVENTIONS

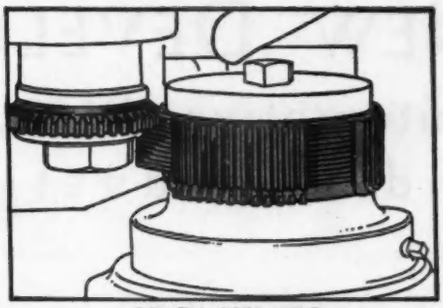
National Association of Taxicab Owners, Chicago .....July 7- 8
National Team & Motor Truck Owners Assoc., Chicago (Annual) .....July 17-19
National Team & Motor Truck Owners Assn., Detroit ....July 17-19
American Chemical Society, Denver, Colo. .....Aug. 22-26
S.A.E. Aircraft Meeting, Cleveland .....Aug. 30-Sept. 1
American Society Mechanical Engineers, Cleveland, Ohio (Machine shop practice meeting) .....Sept. 12-17
American Trade Association Executives, Atlantic City (Annual) .....Sept. 15-17
Penna. Automotive Assn., Harrisburg, Pa. .....Sept. 19-20
Natl. Assoc. of Motor Bus Operators, Chicago .....Sept. 22-23
American Electric Railway Assn., Chicago, Ill. .....Sept. 22-23
Amer. Institute Mining & Met. Engrs. (Petroleum Division), Dallas, Texas .....Sept. 30-Oct. 1
Amer. Society for Steel Treating, Buffalo .....October 3
Amer. Institute Mining & Met. Engrs. (Iron & Steel Division), Buffalo, N. Y. .....Oct. 3-6
National Safety Council, Washington, D. C. .....Oct. 3-7
American Welding Society, Buffalo, N. Y. .....Oct. 3-7
American Society Mechanical Engineers, Buffalo, N. Y. (Natl. Iron and Steel Meeting).....Oct. 3-8
S. A. E. Annual Transportation Meeting, Toronto .....Oct. 4-6
American Gas Association, Atlantic City (Annual) .....Oct. 10-14
Natl. Hardware Assn. (Accessories Branch), Atlantic City, N. J. .....Oct. 17-22
Natl. Tire Dealers Assoc., Atlanta, Ga. .....Nov. 14-16
American Society Mechanical Engineers, New York City (Annual Meeting) .....Dec. 5-9
Natl. Exposition of Power & Mechanical Engineering, New York .....Dec. 5-10

RACES

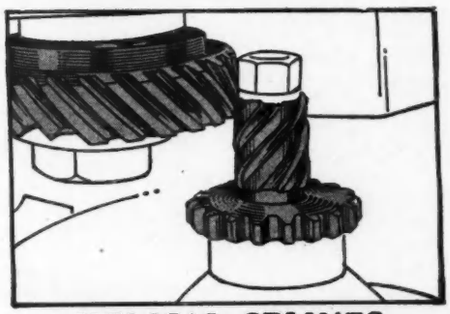
Altoona .....Sept. 5



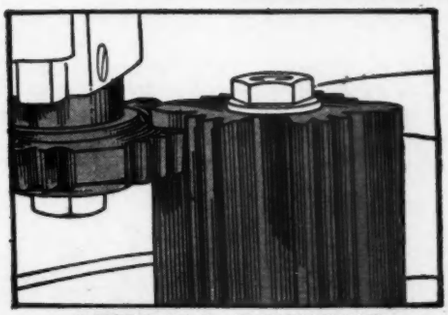
CAMS



SEGMENTS



HELICAL SPLINES



SPECIAL DESIGNS

LAY OUT YOUR DESIGNS

With the Gear Shaper in Mind

The Gear Shaper is a production tool which makes possible the machining of irregular contours in a single operation—and in most cases with a single cutter.

The Original Fellows cutter makes a simple operation of what would otherwise require several operations and additional handling.

You save money and time by employing the Gear Shaper Method—and you get greater accuracy and production as well. Why not submit those new designs to our engineers—we may be able to help cut your costs. Write: The Fellows Gear Shaper Company, 78 River Street, Springfield, Vermont (616 Fisher Bldg., Detroit, Michigan).

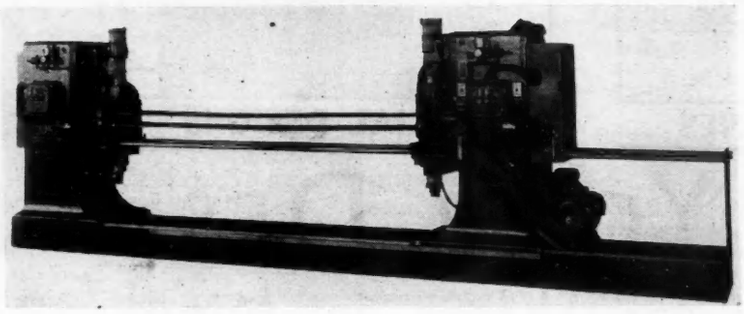
For Accuracy—
For Interchangeability—
For Lowered Machining Costs—

FELLOWS
GEAR SHAPERS

NEW DEVELOPMENTS
Automotive Parts, Accessories and Production Tools

Controlled Heating by Electric Resistance Method

A special application of direct-controlled heating by the electric resistance method has been developed by the Thompson-Gibbs Electric Welding Co., Bay City, Mich., for rapid soldering of parts, consisting of from three to 12 copper tubes on which are assembled a large number of flanged fins, each of which must be thoroughly soldered to each tube for good thermal contact. The tubes are covered with solder, the fins assembled, soldering acid applied, the complete unit clamped in machine, current turned on, and in less than a minute, or more, depending on number of tubes and their length, the entire assembly is thoroughly soldered.



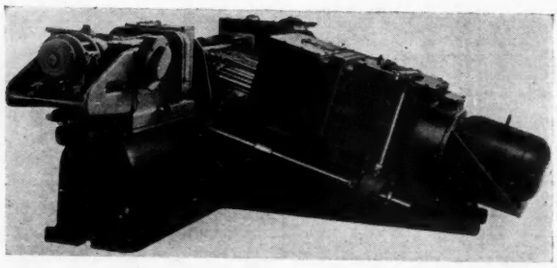
One machine is fixed on base and the other is adjustable along base through distance of 10 ft. by means of motor-driven worm reduction unit, spur gears and rack, motor having reversible drum control. Adjustable time relays are provided to give definite time of heating work.

Clamping of work is by means of air cylinders and all work-clamping jaws are adjustable, and special provision is made for uniform clamping pressure and distribution of current to all tubes to insure uniform heating.

This method of direct-controlled heating by electrical resistance has applications to many similar classes of work besides soldering, such as heating for annealing, heat treating, heating for forging, bending and other processes.

Foote-Burt Driller

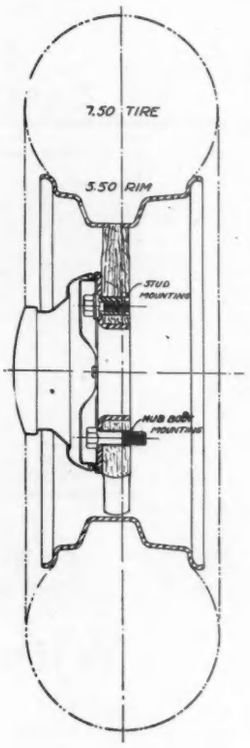
Here is a rear view of the 3-way, 39-spindle drilling machine recently furnished by the Foote-Burt Co., Cleveland, Ohio, for use in drilling bottom and ends of an automobile cylinder head.



The side heads each have 4 spindles and are driven by latest design 10 in. diameter cam units. The rear head has 31 spindles and is driven by a 14 in. diameter cam unit. Each of the units is complete within itself having individual motor drive. The main lever is used by starting the cycle and each head goes through the cycle and returns to the starting point where it remains until the starting lever is again operated. The holes drilled by the rear unit are rather deep and this unit is placed at a 10 deg. angle to aid in the removal of chips during the drilling operation.

Replacement Wheels for Super-Balloons

Hoopes, Bro. & Darlington, Inc., West Chester, Pa., are now offering artillery wood spoke air balloon type wheels that are demountable at the hub. These wheels are available in 7.50/15 and 6.50/16 in. sizes for practically all popular cars from 1929 to date, and structural details are given in the accompanying drawing.



These Hoopes wheels are furnished with chrome-plated hub caps and special hub nuts complete to fit the hubs of the cars for which the wheel is intended.

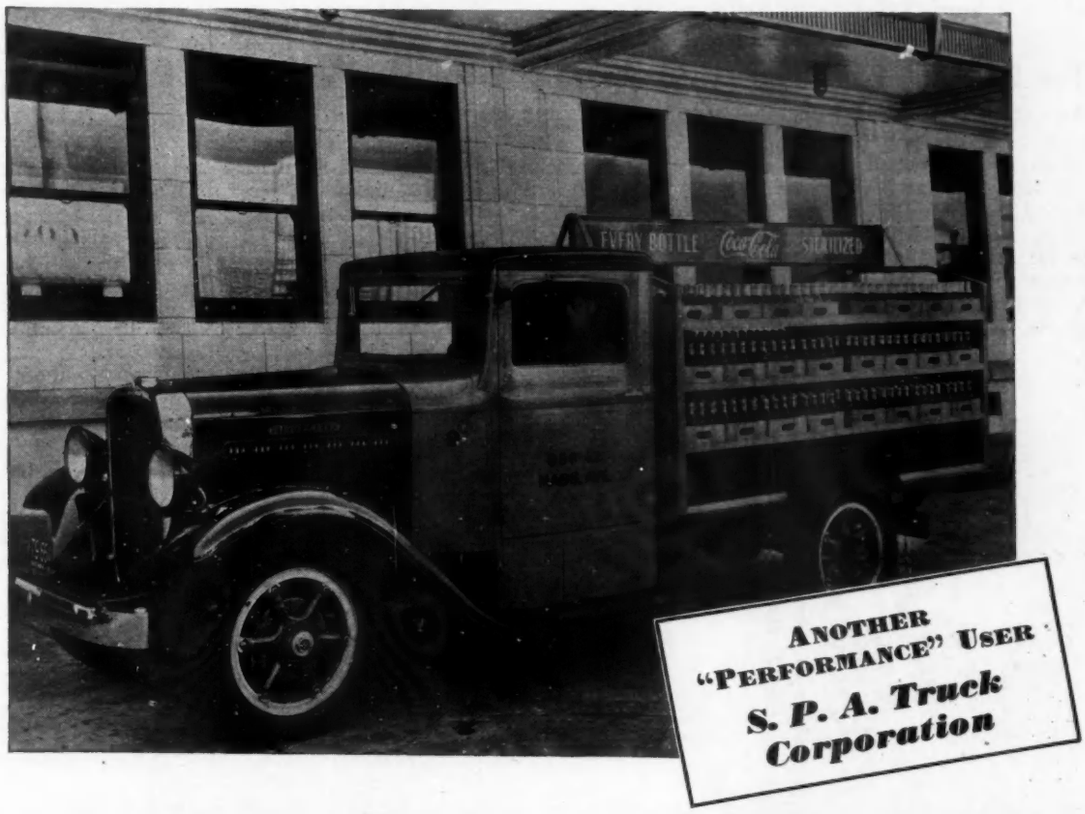
Natural varnish, paint prime or aluminum finishes are available.

Lewis-Sheppard Lift Truck

A line of rubber-tired lift trucks with a capacity up to 5000 lb. and featuring horizontal release of load has been added by the Lewis-Sheppard Co., Boston, Mass., The "Gold Flash" lowers the load forward and downward at the same time. The descending load cannot grind down along the next load behind. Just a slight backward roll of the truck as the load descends prevents loss of any floor space.

The handle when in load-raising position is always connected to the load. Therefore the operator cannot pull on an empty handle and crash backward onto the floor. To release the load from its elevated position, the operator has only to press lightly on the release pedal. The lock rolls out of engagement.

ROLLING ALONG WITH SKF SELF-ALIGNMENT

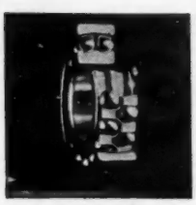


ANOTHER "PERFORMANCE" USER
S. P. A. Truck Corporation

WHERE PERFORMANCE TAKES PREFERENCE OVER PRICE

One of twenty-five trucks in the Coca-Cola fleet, all equipped with SKF Self-Aligning Ball Bearings on the propeller shaft, this 1½ ton Studebaker truck, gives ample opportunity for SKF to prove in heavy duty service, why SKF Performance Takes Preference Over Price with the entire fleet.

The outstanding feature of the SKF Self-Aligning Ball Bearing is its inherent characteristic of rolling self-alignment... invaluable on the drive shaft location. Coupled with this is the utmost dependability . . . no matter how severe or how long operating demands may be. Add to these very little attention plus a minimum of maintenance and the result is...the most mileage per bearing dollar.



● *You may buy a bearing as a bargain but try and get a bargain out of using it, for nothing is apt to cost so much as a bearing that cost so little.*

2921

SKF INDUSTRIES, INC. 40 EAST 34th STREET, NEW YORK, N. Y.

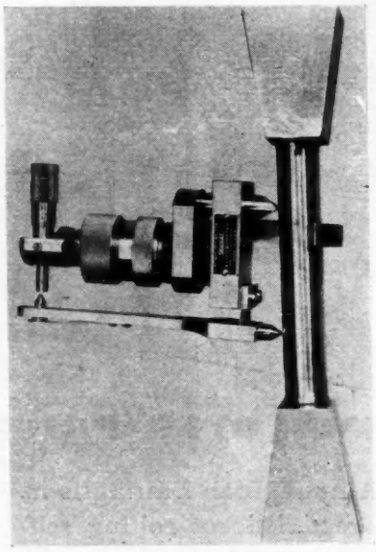
SKF

Ball and Roller Bearings

NEW DEVELOPMENTS
Automotive Parts, Accessories and Production Tools

The Oxweld Extensometer

An extensometer for determining the yield point of specimens being tested in an Oxweld Portable Tensile Testing Machine, has been announced by The Linde Air Products Co., New York, N. Y. The sensitivity of the device is such that it is said to indicate the elongation in a standard A. S. T. M. test specimen occasioned by the heat of the human hand.



In operation the two points of the Oxweld Extensometer are clamped on the specimen in such a manner that the elongation between the two points during tension is multiplied in a ratio of 5-to-1 by a lever bar making electrical contact with the micrometer head. The moment of contact is indicated by the flash of a small electric light in the extensometer head.

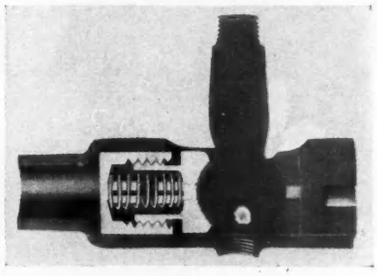
To determine the yield point, it is only necessary to back off the micrometer head two complete turns (0.050 in., which allows for the 5-to-1 ratio in the lever bar) from the zero reading (the point at which electrical contact is broken) and apply the load, increasing the tension until the light flashes. The flash indicates that the yield point has been reached, and this may be read from the load-indicating device on the tensile testing machine.

Automatic Bearing for Tie-Rods and Drag Links

A new self-adjusting bearing for drag links and tie rods, the No-Ro-Shox, is being manufactured and distributed by the Wigginton Co. of Kalamazoo, Mich.

Details of its construction may be seen from the sectional view reproduced herewith. It is claimed to eliminate shimmy, wheel fight, road shock and wandering caused by loose tie rods or drag links.

Installation of these bearings is said to reduce the pressure on the tie-rod and drag link bearings to a minimum,



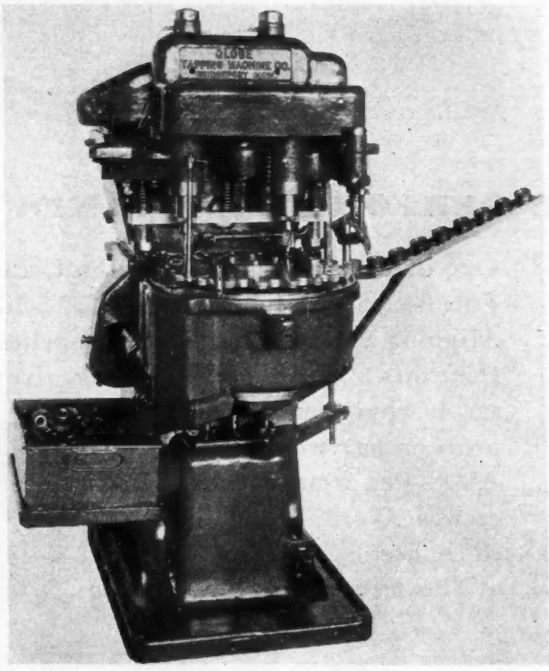
thus eliminating one cause of hard steering and excessive wear of steering worms, gears and ball joints.

The bearings are compact and can be used on balls integral with the pitman or steering arm. The thrust is taken on the threads.

Globe Tapping Machine With Dial Feed

An automatic drilling or tapping machine of universal application has been developed by the Globe Tapping Machine Co., Bridgeport, Conn.

The machine shown in the illustration is equipped with two heavy-duty spindles carrying ⅝ in. x 1¼ in. spot facing cutters for facing off the protruding inner shaft bushing of a commutator at a rate of 20 finished pieces per minute. One operator is able to load the chutes on several machines as the parts are automatically fed into the dial from the chute. The ejection of the finished parts are automatic.



By using two ball bearing spindles, one for roughing and one for finishing, the parts are finished free from all chatter marks. If the dial should fail to index properly, due to any abnormal resistance, the automatic mechanical trip, which is standard on all machines, will prevent the head from coming down.

The main drive consists of a 3-hp. capacity nickel-steel worm mounted on ball bearings, meshed with an automotive phosphor bronze worm gear substantially mounted on two large roller bearings. The electric motor is mounted on a tilting plate in the base of the machine to permit tightening and adjustment of the belt.